



Appendix for test report



1Appendix_A: Effective (Isotropic) Radiated Power Output Data

Part I - Test Results

Test Band	Test Mode	Test Channel	Measured[dBm]	EIRP/ERP [dBm]	Limit [dBm]	Verdict
GSM850	GSM/TM1	LCH	32.39	27.34	38.5	PASS
		MCH	32.47	27.42	38.5	PASS
		HCH	32.46	27.41	38.5	PASS
	GSM/TM2	LCH	26.07	21.02	38.5	PASS
		MCH	26.01	20.96	38.5	PASS
		HCH	25.96	20.91	38.5	PASS
GSM1900	GSM/TM1	LCH	30.12	32.12	33	PASS
		MCH	29.83	31.83	33	PASS
		HCH	29.67	31.67	33	PASS
	GSM/TM2	LCH	25.27	27.27	33	PASS
		MCH	25.22	27.22	33	PASS
		HCH	25.14	27.14	33	PASS



Note1:

a, For getting the ERP (Efficient Radiated Power) or EIRP (Efficient Isotropic Radiated Power) in substitution method, the following formula should be taken to calculate it,

$$\text{ERP [dBm]} = \text{SGP [dBm]} - \text{Cable Loss [dB]} + \text{Gain [dBd]}$$

$$\text{EIRP [dBm]} = \text{SGP [dBm]} - \text{Cable Loss [dB]} + \text{Gain [dBi]}$$

b, SGP=Signal Generator Level

Note2:

$$\text{SET Span} = 1.5 * \text{OBW}$$

$$\text{SET RBW} = 1\% \text{ of the OBW, not to exceed 1MHz}$$

$$\text{SET VBW} \geq 3 * \text{RBW}$$

SET Sweep time = auto - couple.

Detector: RMS



2Appendix_B: Peak-to-Average Ratio

Part I - Test Results

Test Band	Test Mode	Test Channel	Measured[dB]	Limit [dB]	Verdict
GSM850	GSM/TM1	LCH	0.12	13	PASS
		MCH	0.13	13	PASS
		HCH	0.12	13	PASS
	GSM/TM2	LCH	3.16	13	PASS
		MCH	3.04	13	PASS
		HCH	3.13	13	PASS

Test Band	Test Mode	Test Channel	Measured[dB]	Limit [dB]	Verdict
GSM1900	GSM/TM1	LCH	0.14	13	PASS
		MCH	0.14	13	PASS
		HCH	0.12	13	PASS
	GSM/TM2	LCH	3.14	13	PASS
		MCH	3.07	13	PASS
		HCH	3.14	13	PASS

3Appendix_C: Modulation Characteristics

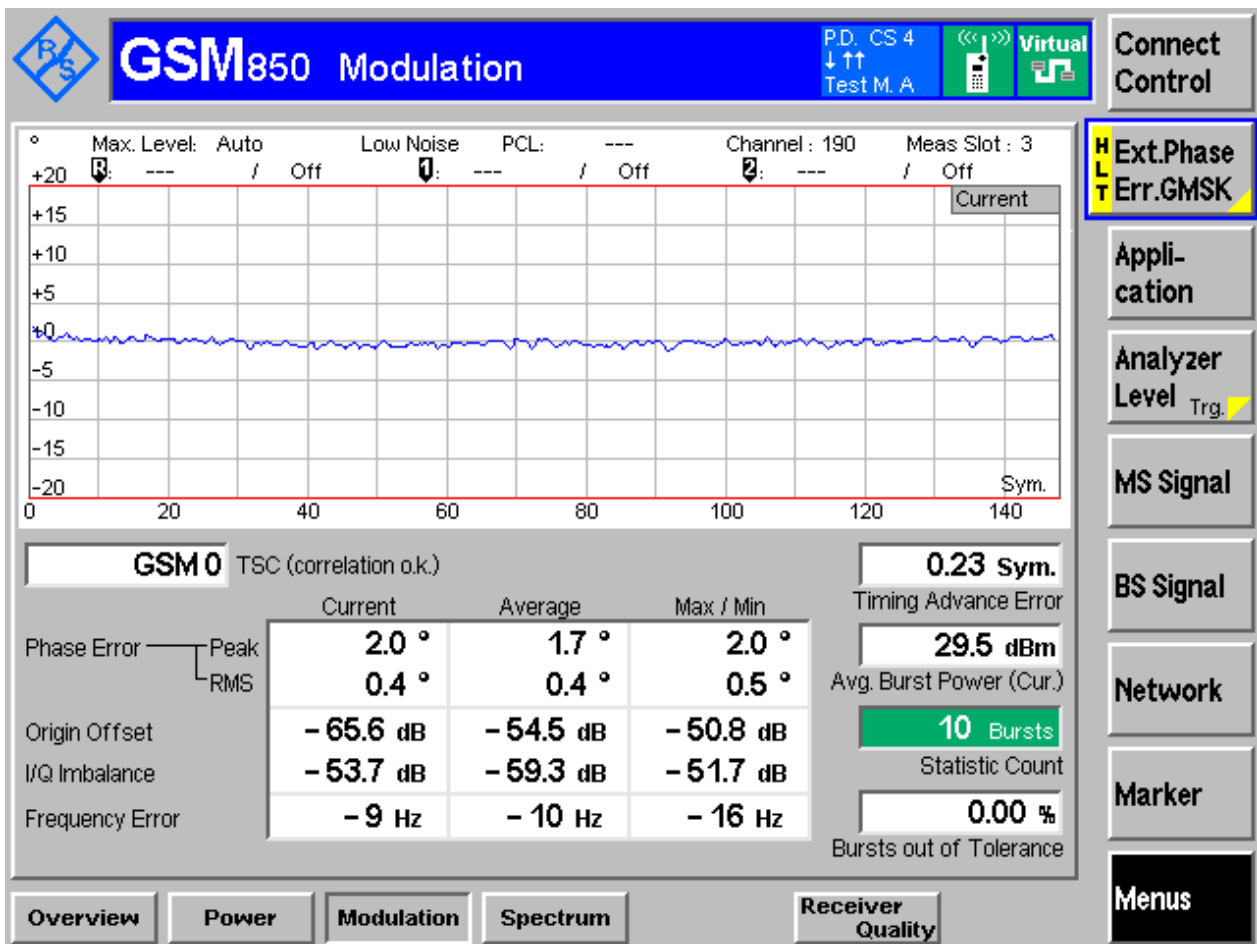
Part I - Test Plots

3.1 For GSM

3.1.1 Test Band = GSM850

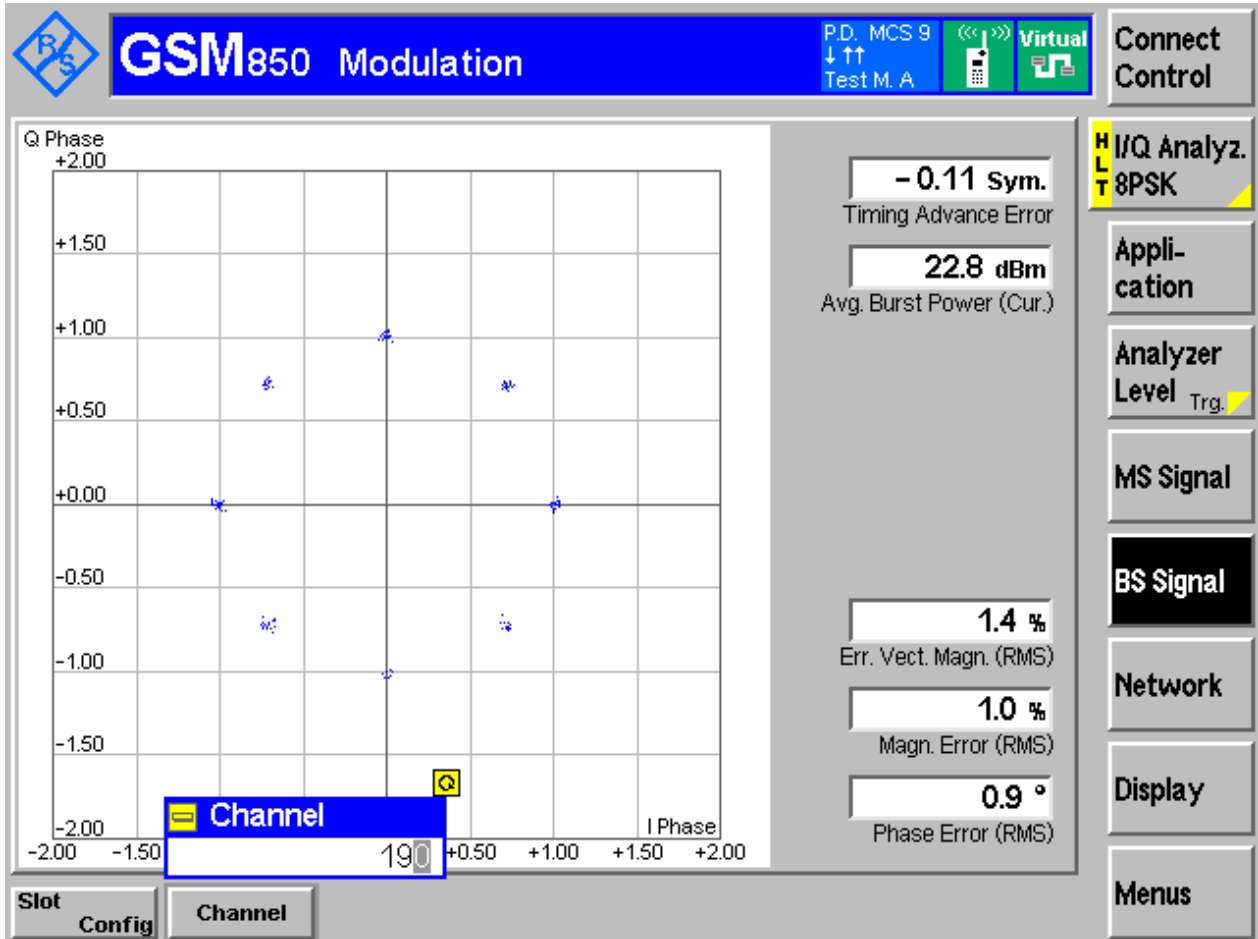
3.1.1.1 Test Mode = GSM/TM1

3.1.1.1.1 Test Channel = MCH



3.1.1.2 Test Mode = GSM/TM2

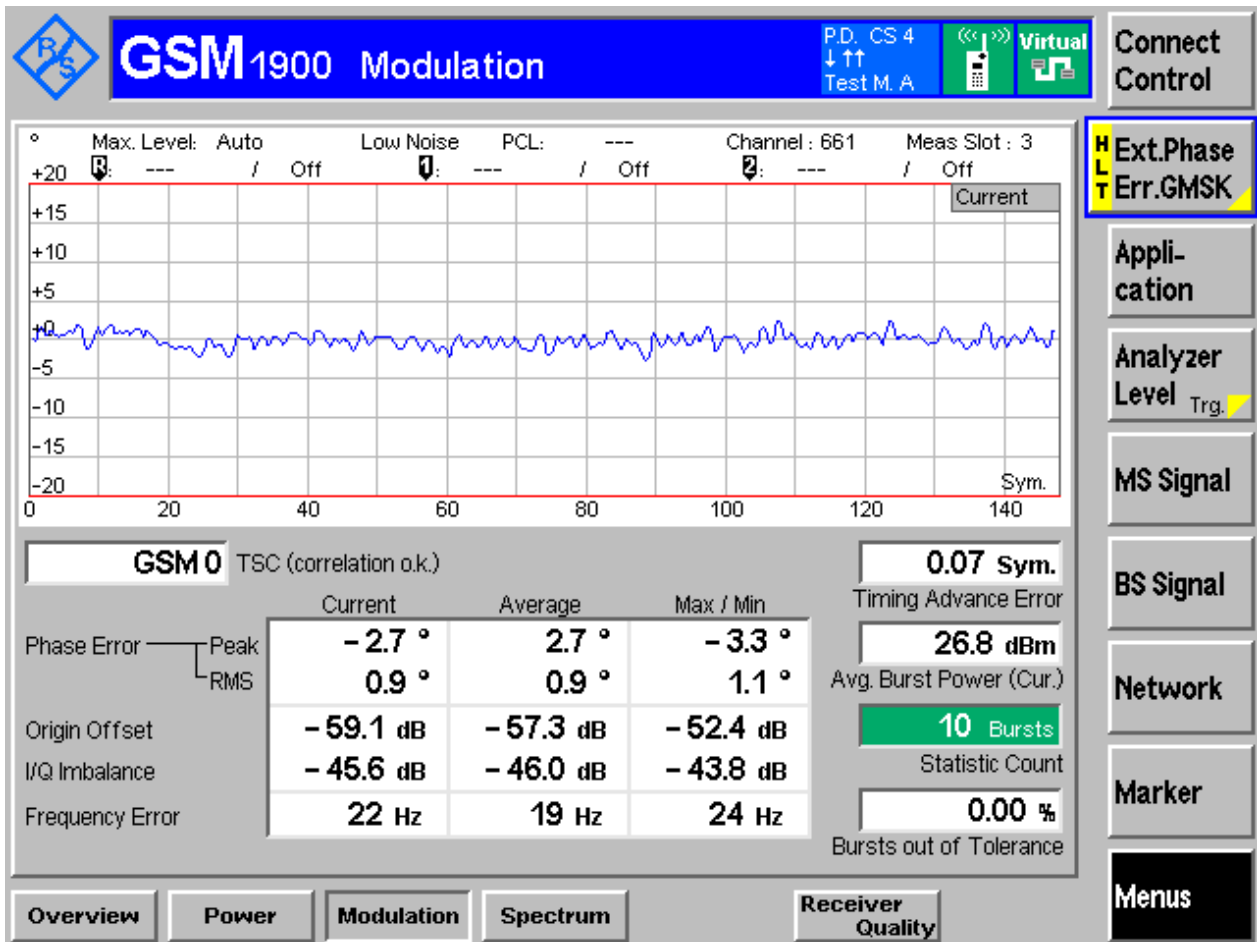
3.1.1.2.1 Test Channel = MCH



3.1.2 Test Band = GSM1900

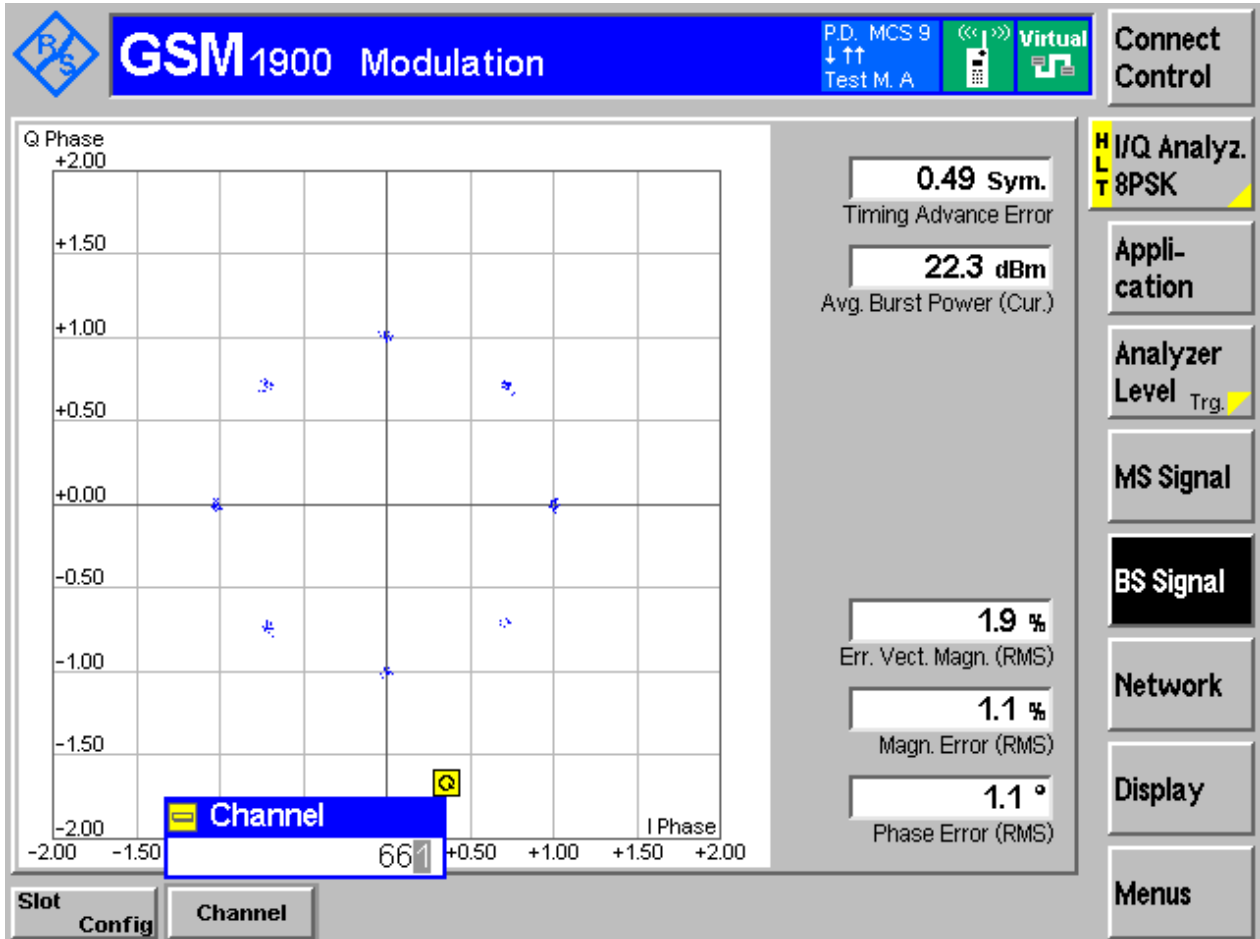
3.1.2.1 Test Mode = GSM/TM1

3.1.2.1.1 Test Channel = MCH



3.1.2.2 Test Mode = GSM/TM2

3.1.2.2.1 Test Channel = MCH





4Appendix_D: Bandwidth

Part I - Test Results

Test Band	Test Mode	Test Channel	Occupied Bandwidth [kHz]	Emission Bandwidth [kHz]	Verdict
GSM850	GSM/TM1	LCH	245.11	315.23	Pass
		MCH	244.81	310.06	Pass
		HCH	243.29	311.76	Pass
	GSM/TM2	LCH	247.46	314.96	Pass
		MCH	252.34	322.18	Pass
		HCH	245.53	318.15	Pass
GSM1900	GSM/TM1	LCH	246.75	316.02	Pass
		MCH	247.58	314.84	Pass
		HCH	249.74	319.75	Pass
	GSM/TM2	LCH	246.83	320.13	Pass
		MCH	247.77	317.77	Pass
		HCH	249.25	318.37	Pass



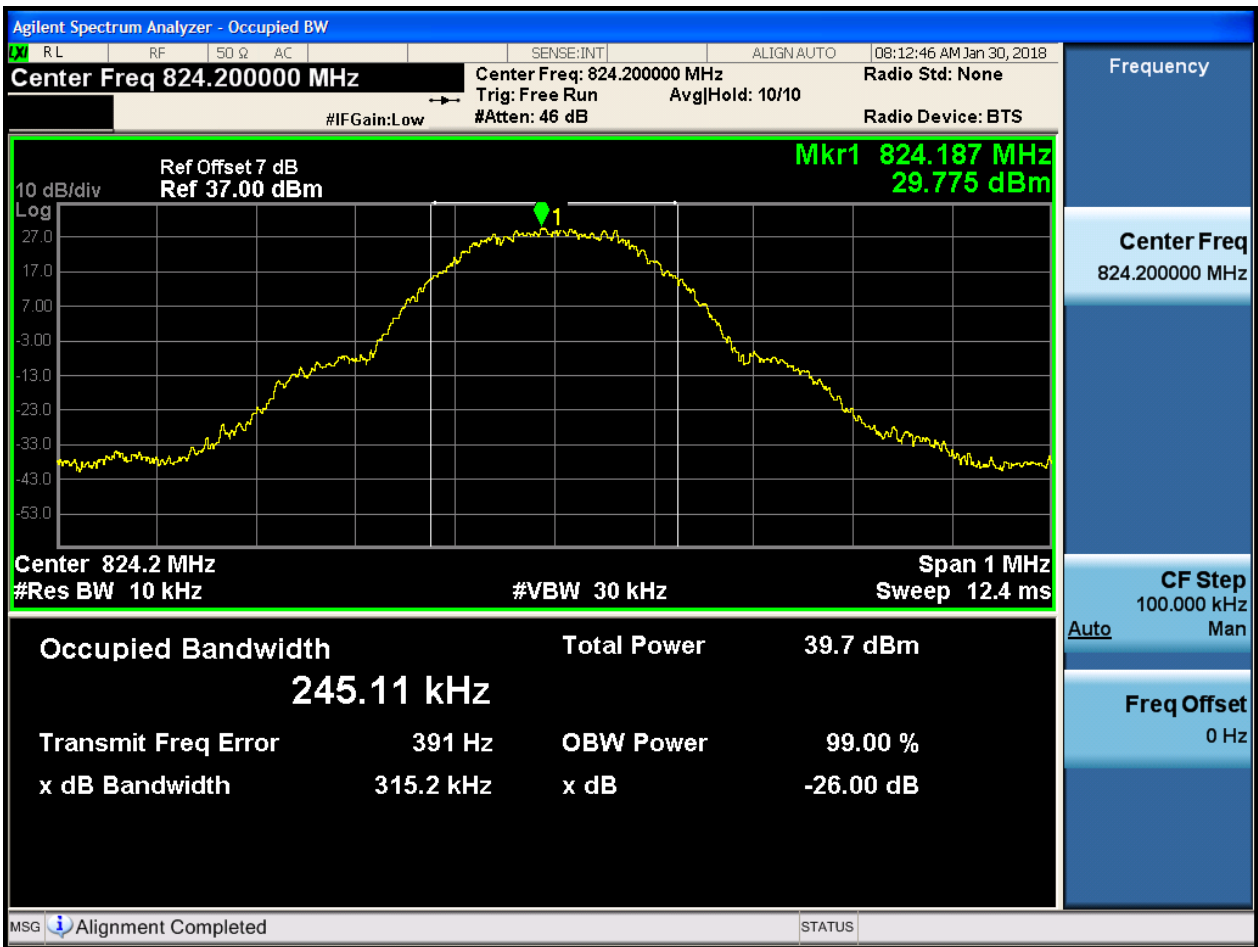
Part II - Test Plots

4.1 For GSM

4.1.1 Test Band = GSM850

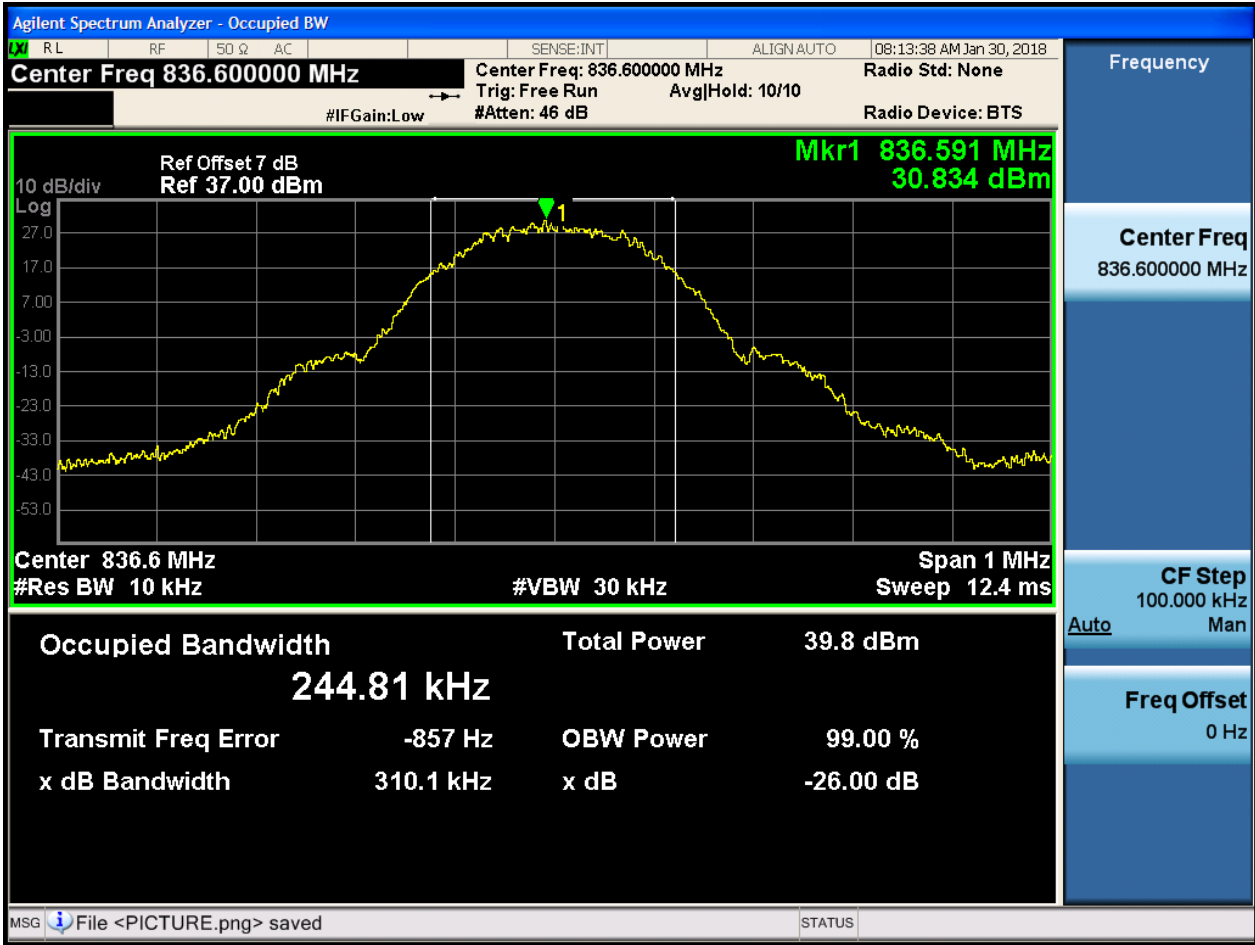
4.1.1.1 Test Mode = GSM/TM1

4.1.1.1.1 Test Channel = LCH





4.1.1.1.2 Test Channel = MCH





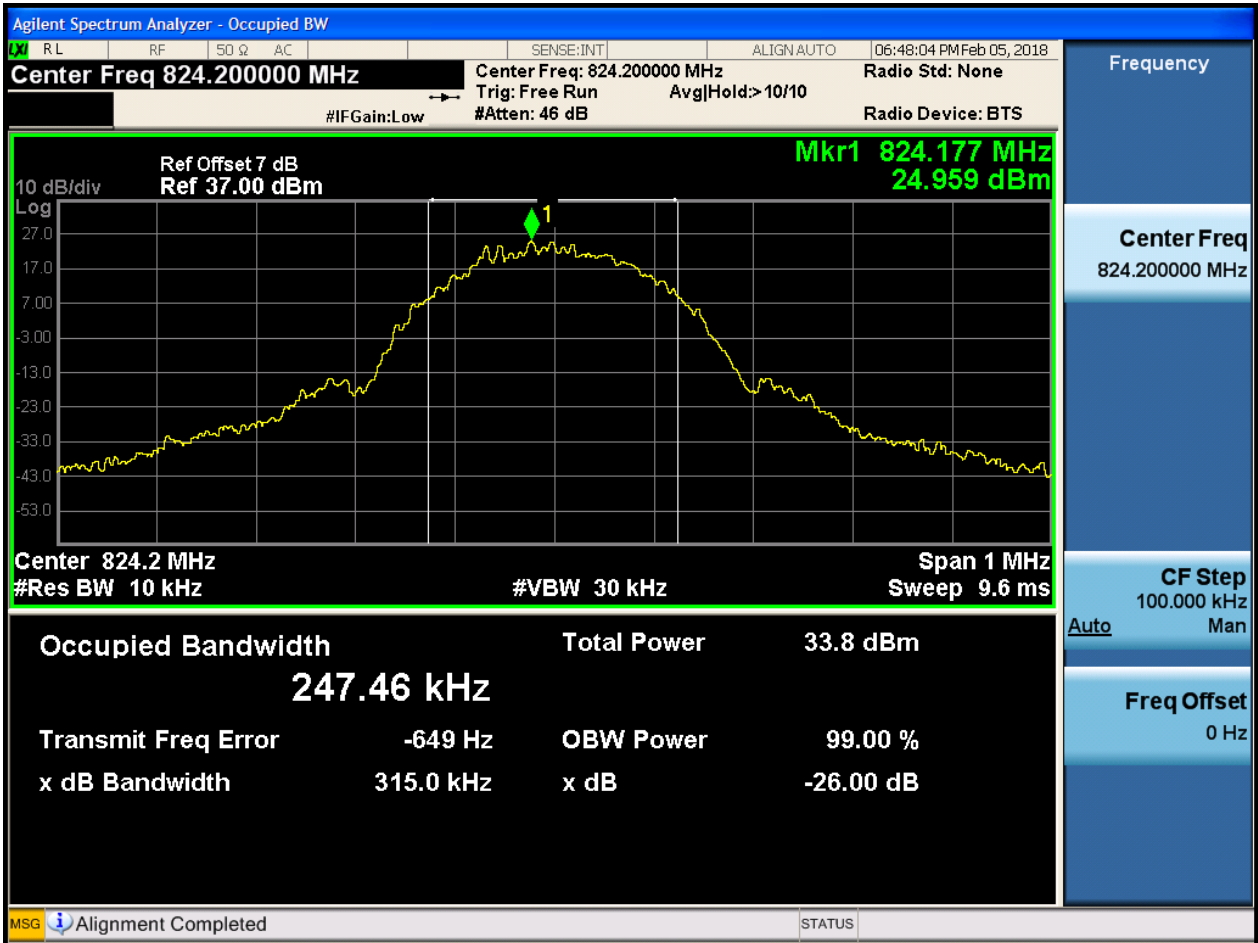
4.1.1.1.3 Test Channel = HCH





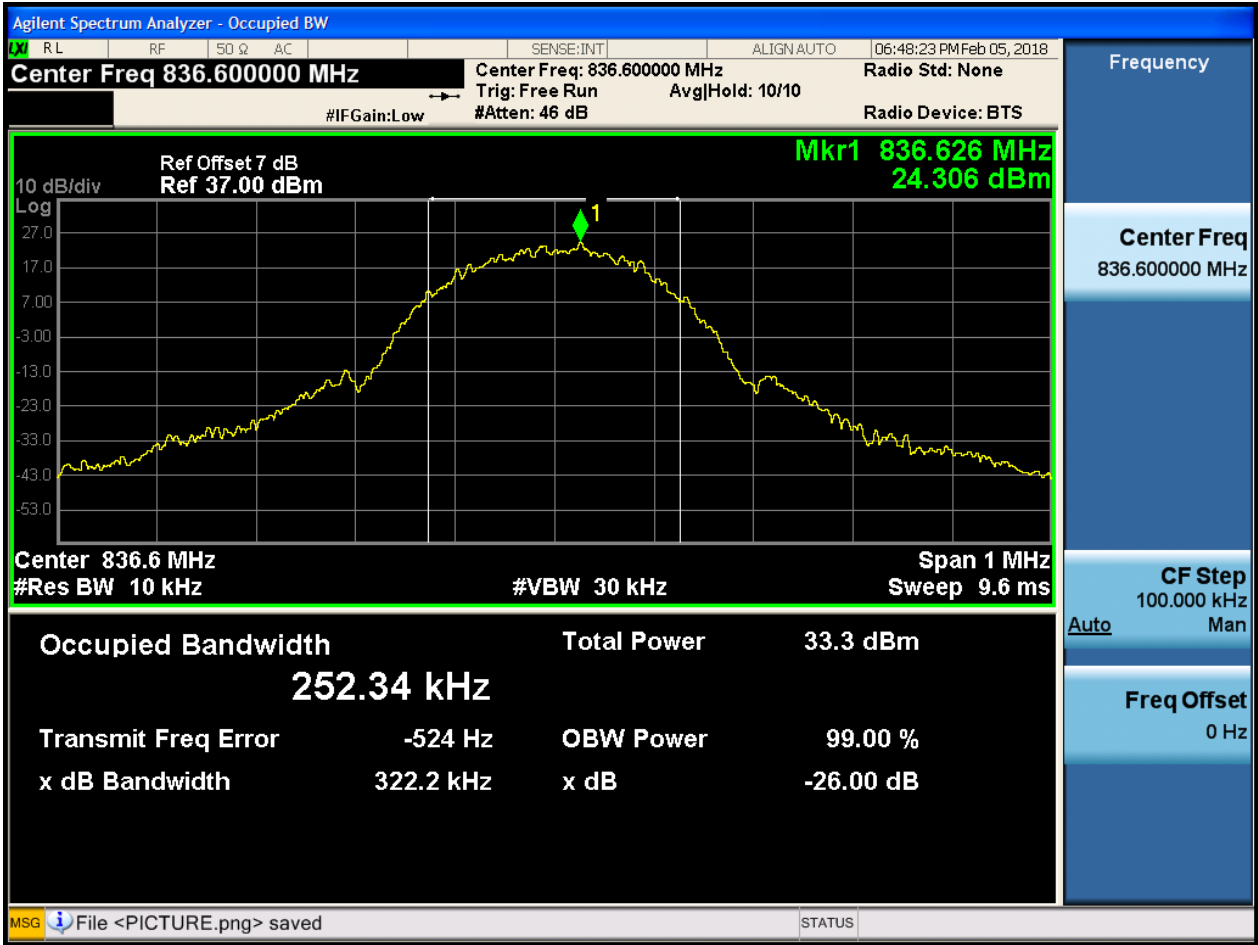
4.1.1.2 Test Mode = GSM/TM2

4.1.1.2.1 Test Channel = LCH



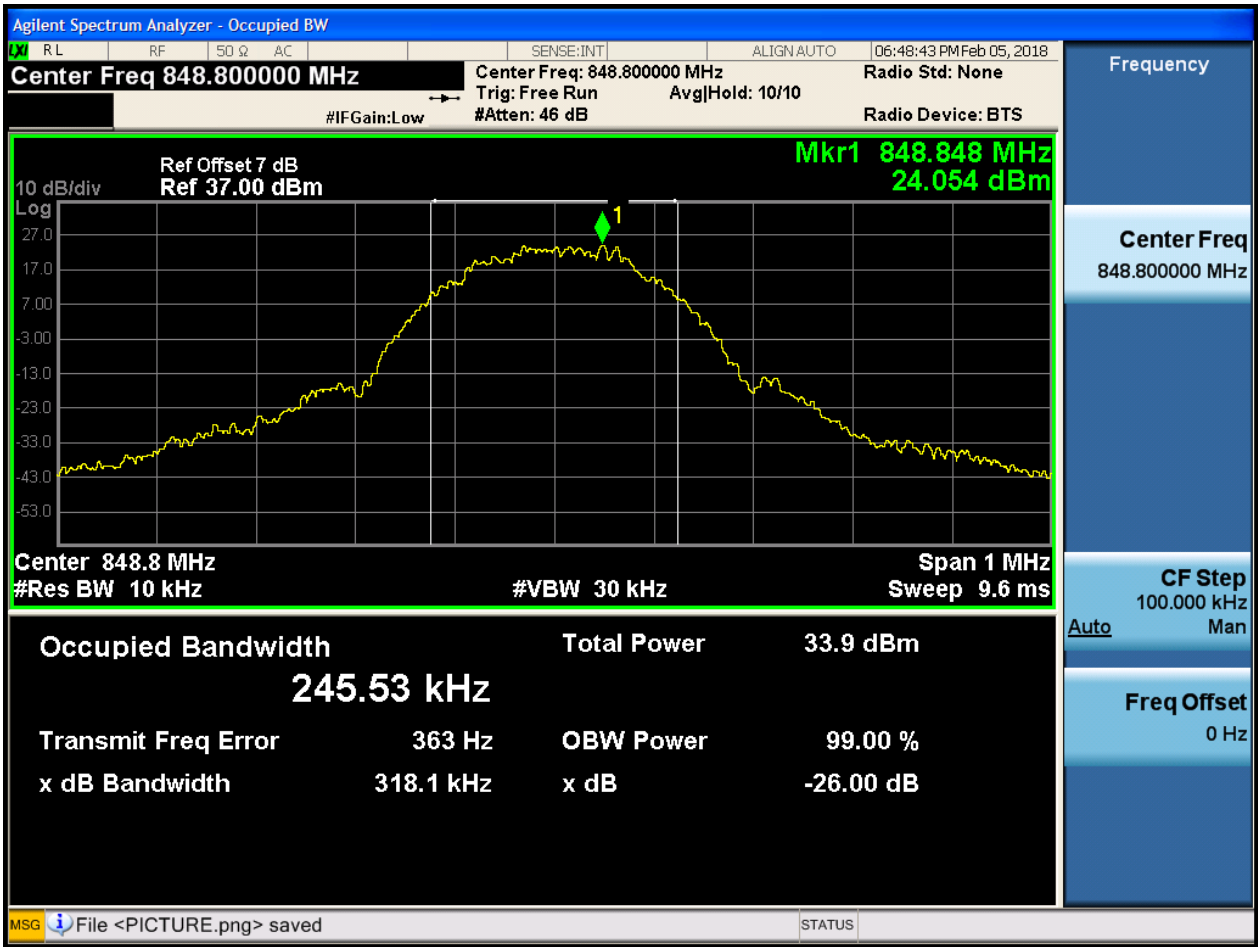


4.1.1.2.2 Test Channel = MCH





4.1.1.2.3 Test Channel = HCH

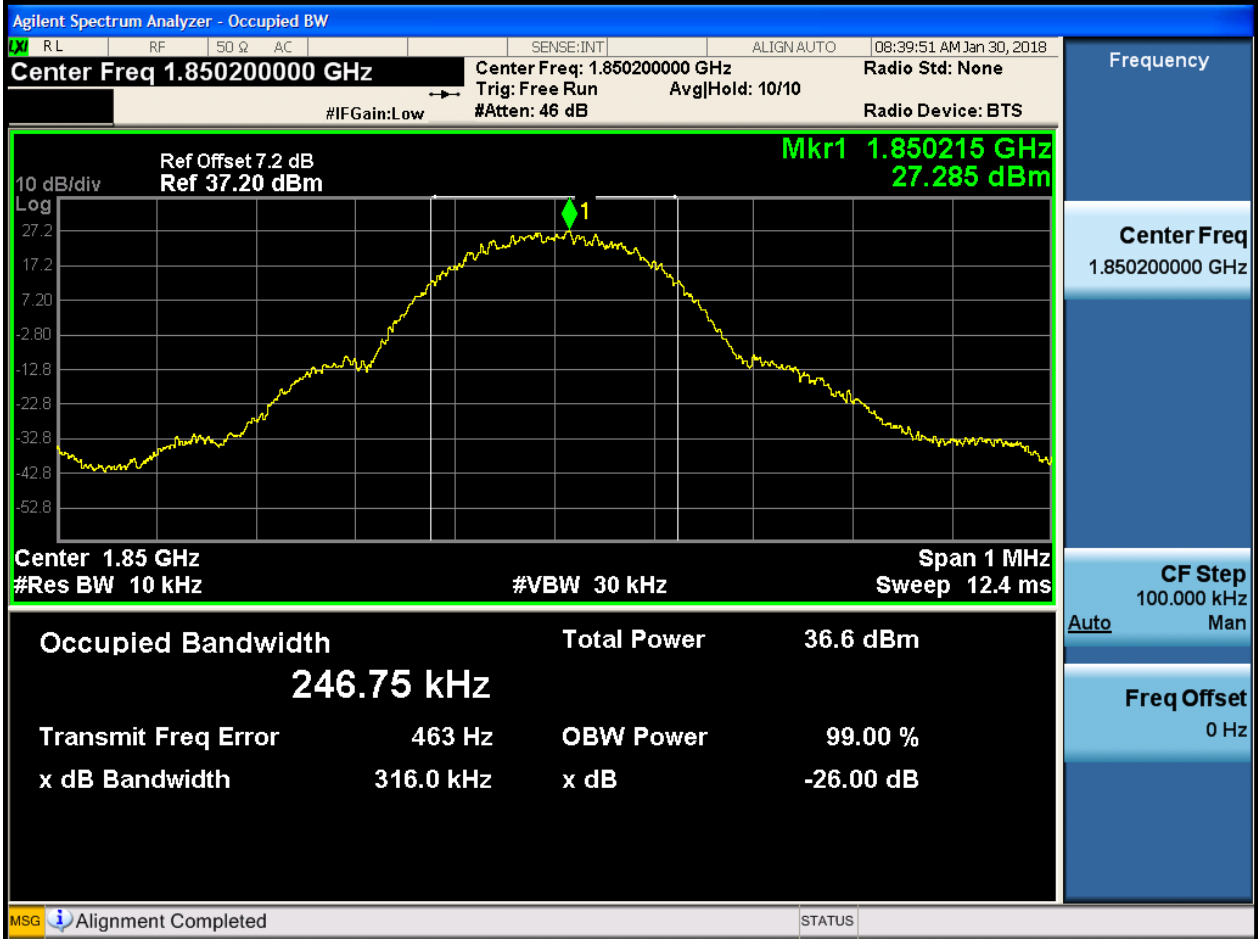




4.1.2 Test Band = GSM1900

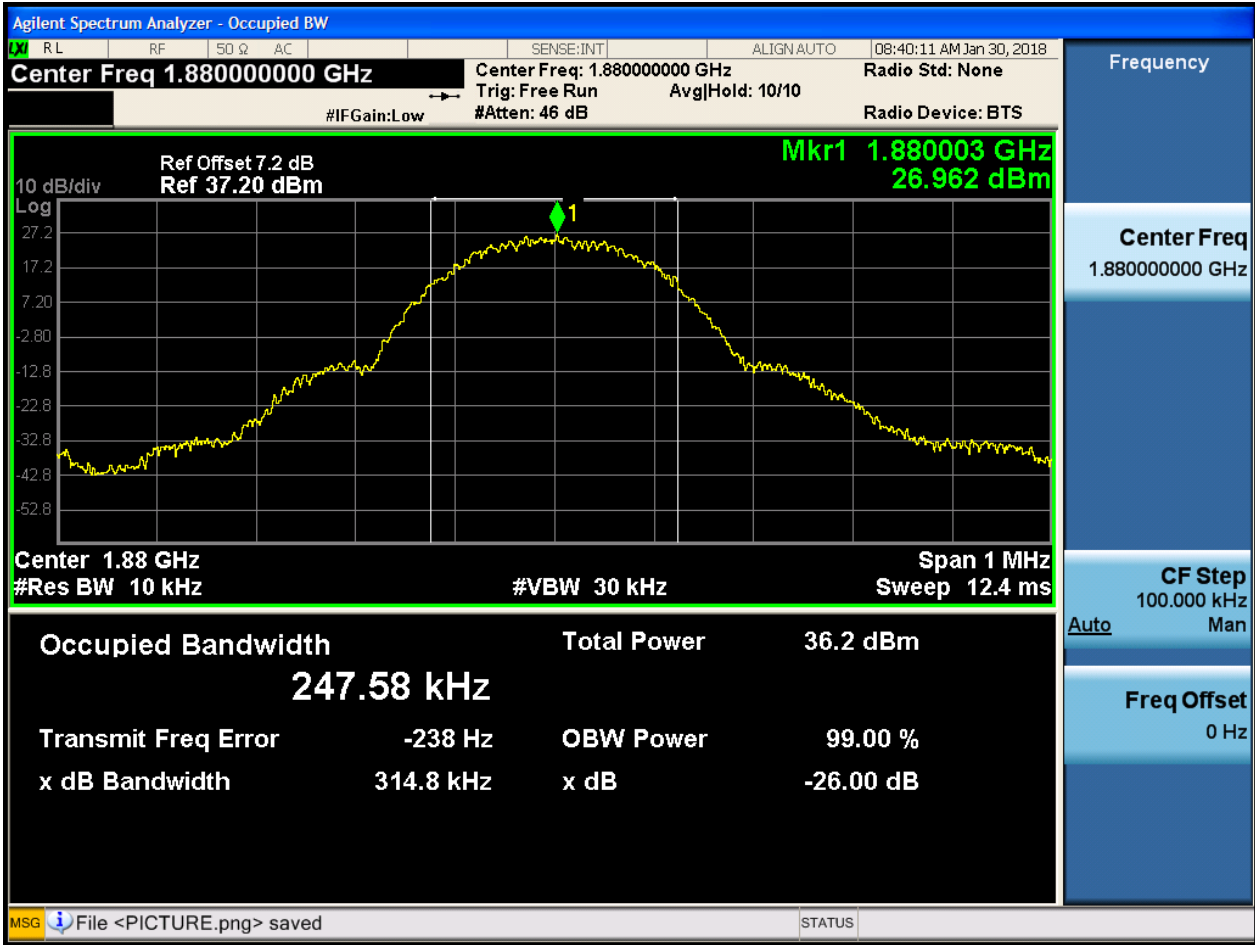
4.1.2.1 Test Mode = GSM/TM1

4.1.2.1.1 Test Channel = LCH



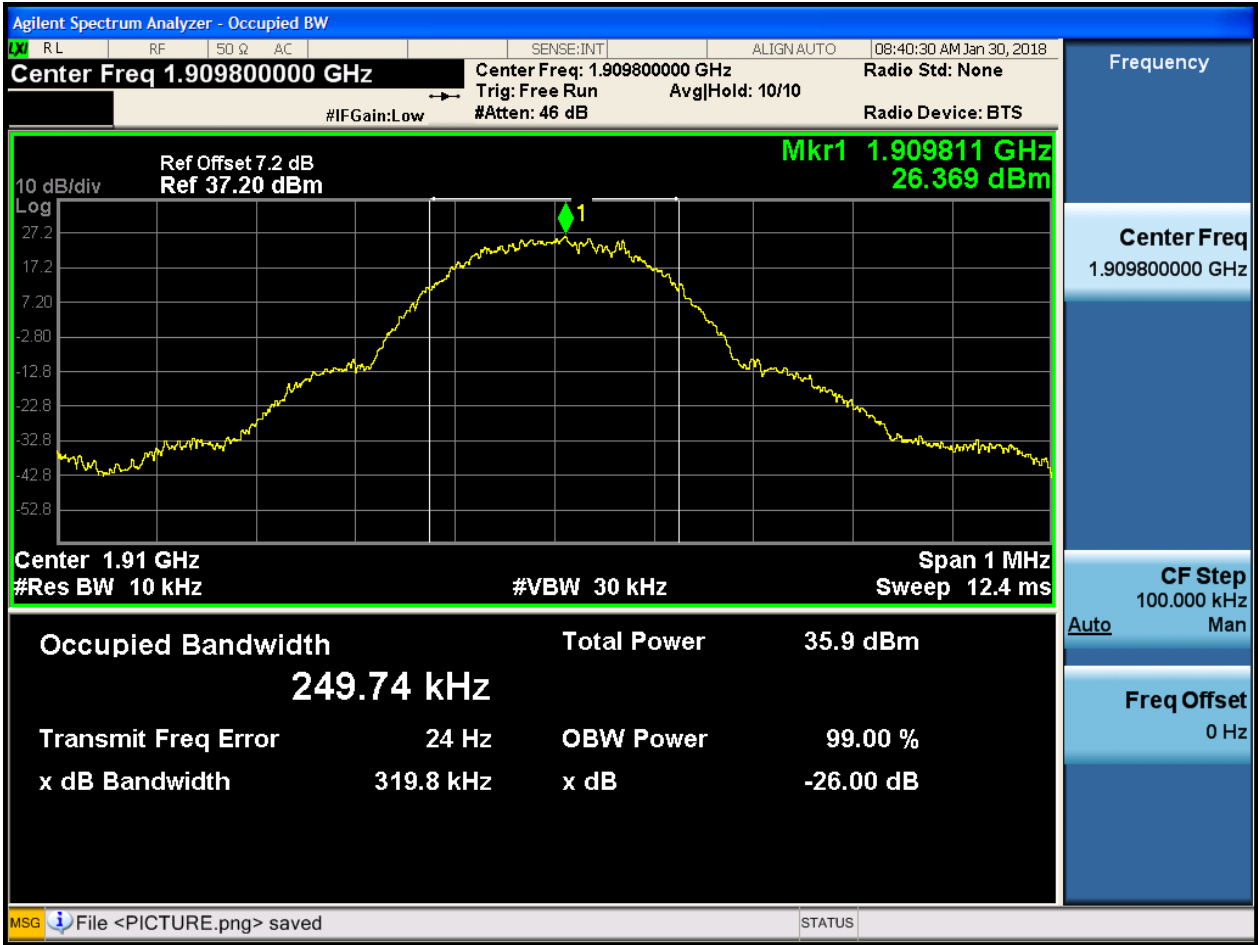


4.1.2.1.2 Test Channel = MCH





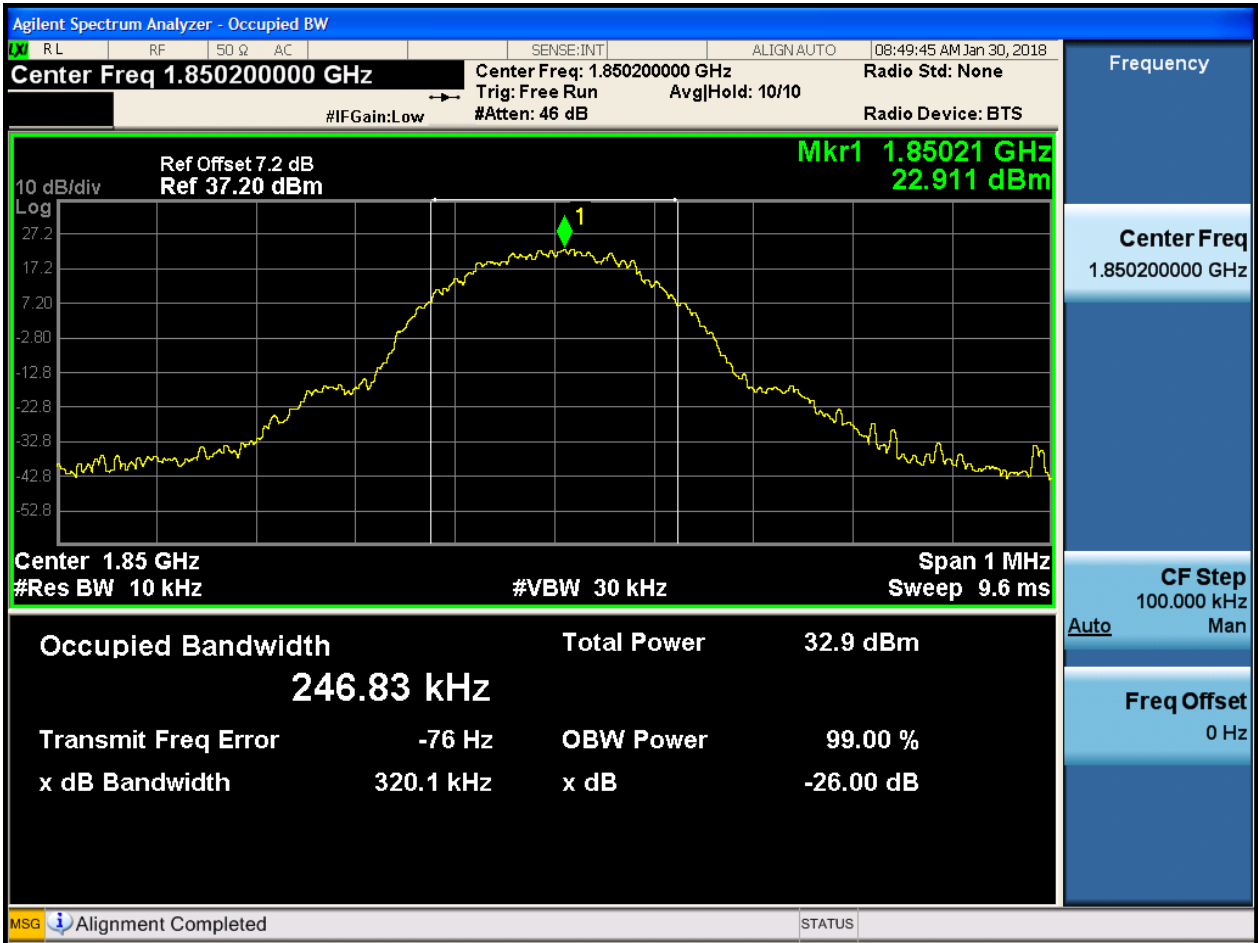
4.1.2.1.3 Test Channel = HCH





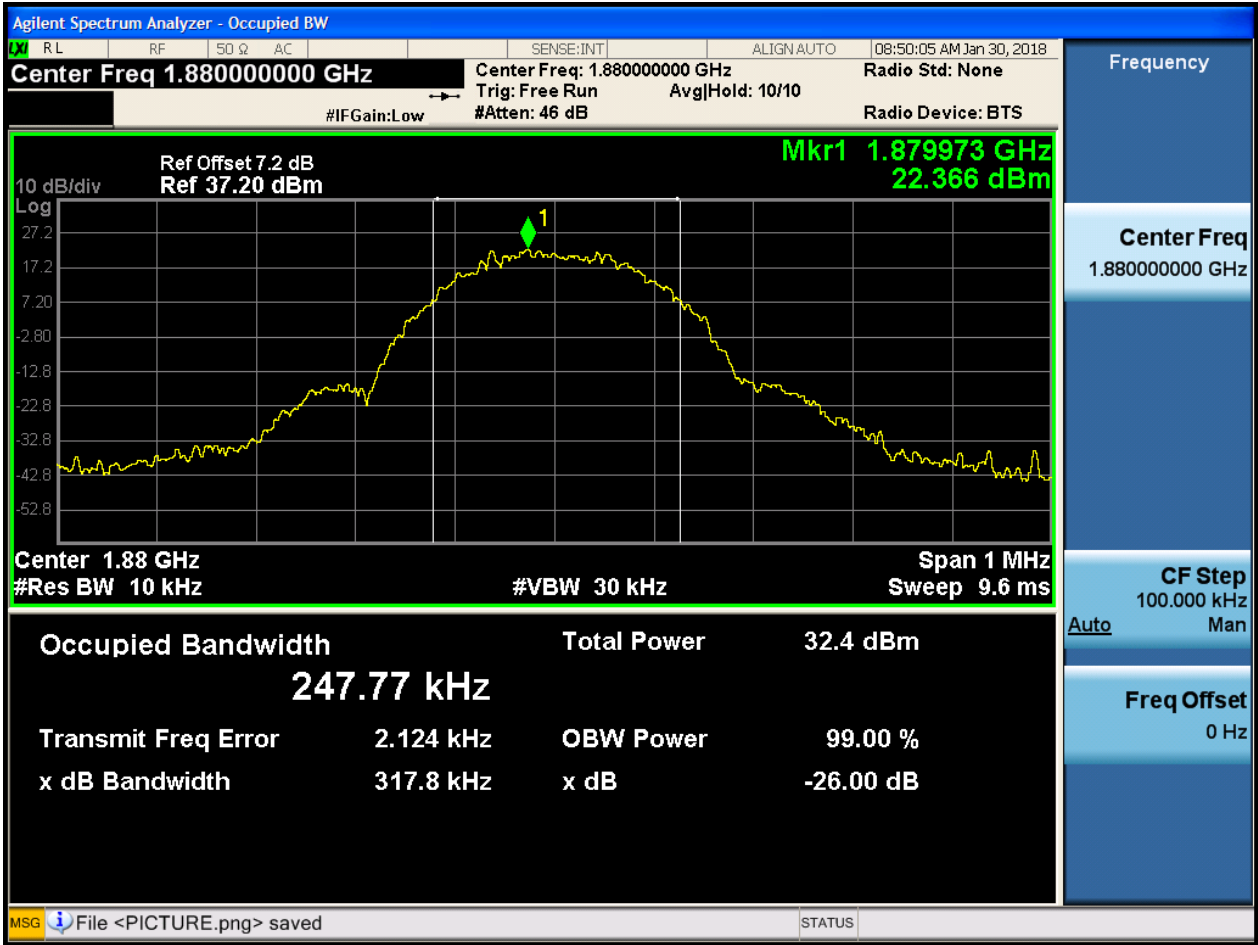
4.1.2.2 Test Mode = GSM/TM2

4.1.2.2.1 Test Channel = LCH



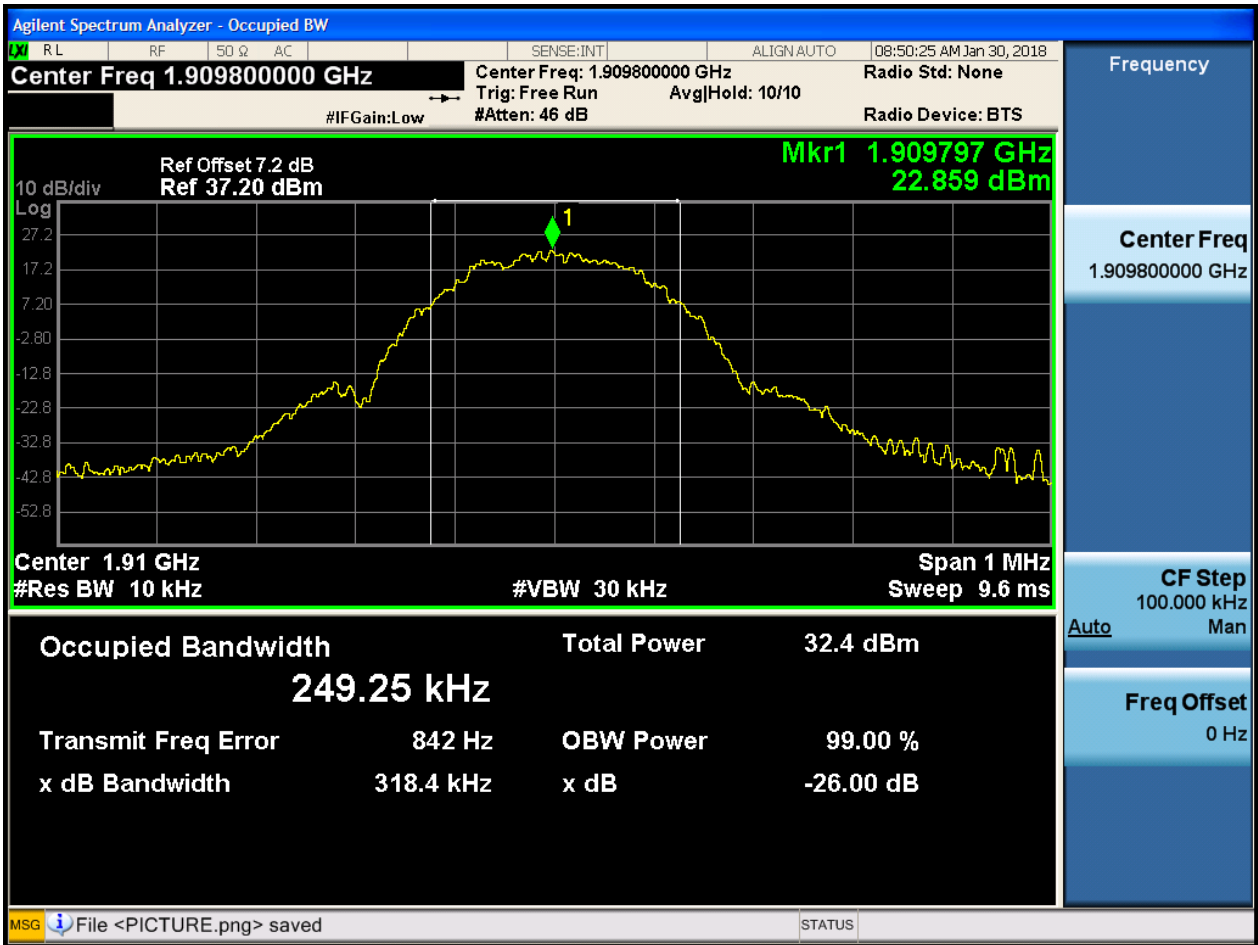


4.1.2.2.2 Test Channel = MCH





4.1.2.2.3 Test Channel = HCH





5Appendix_E: Band Edges Compliance

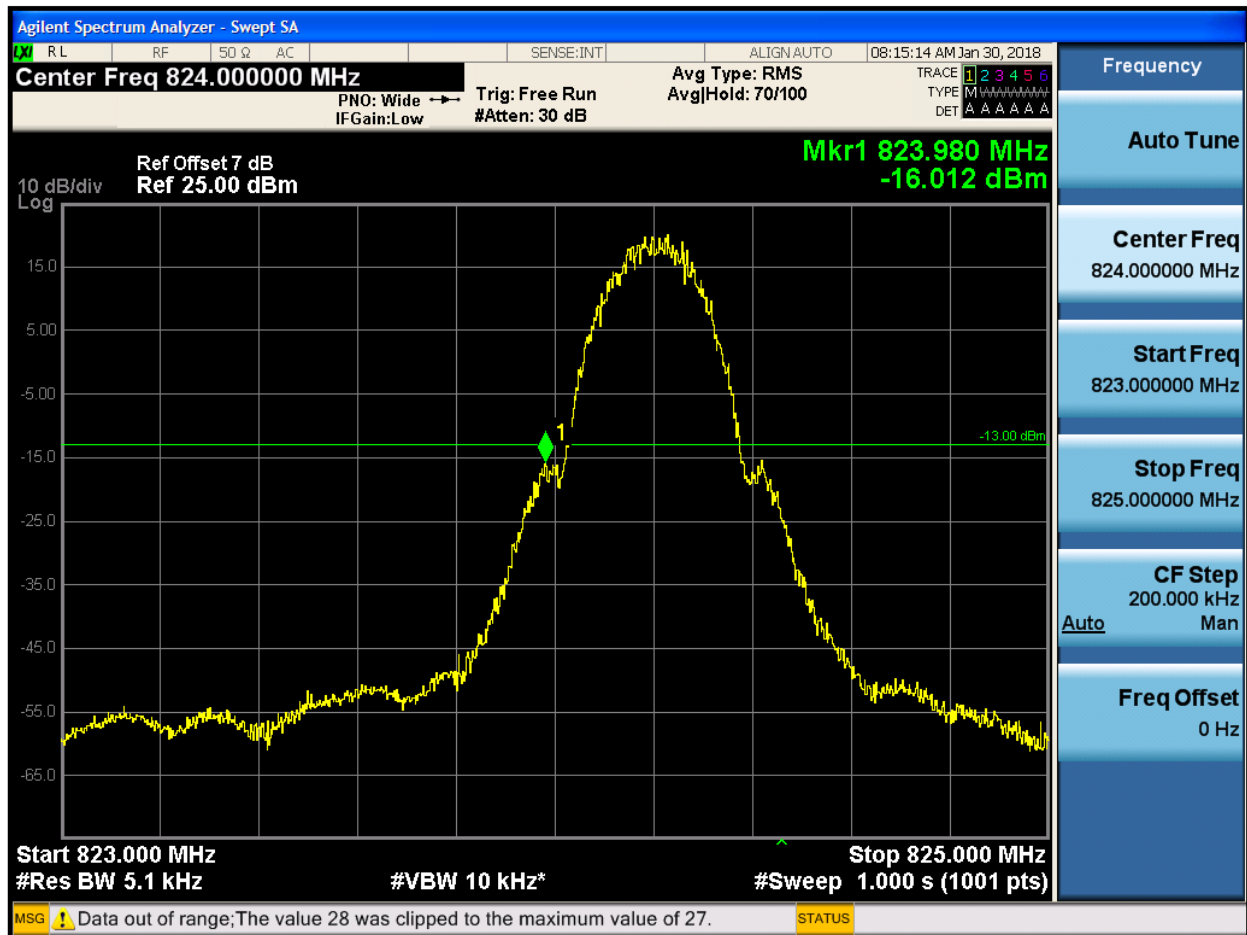
Part I - Test Plots

5.1 For GSM

5.1.1 Test Band = GSM850

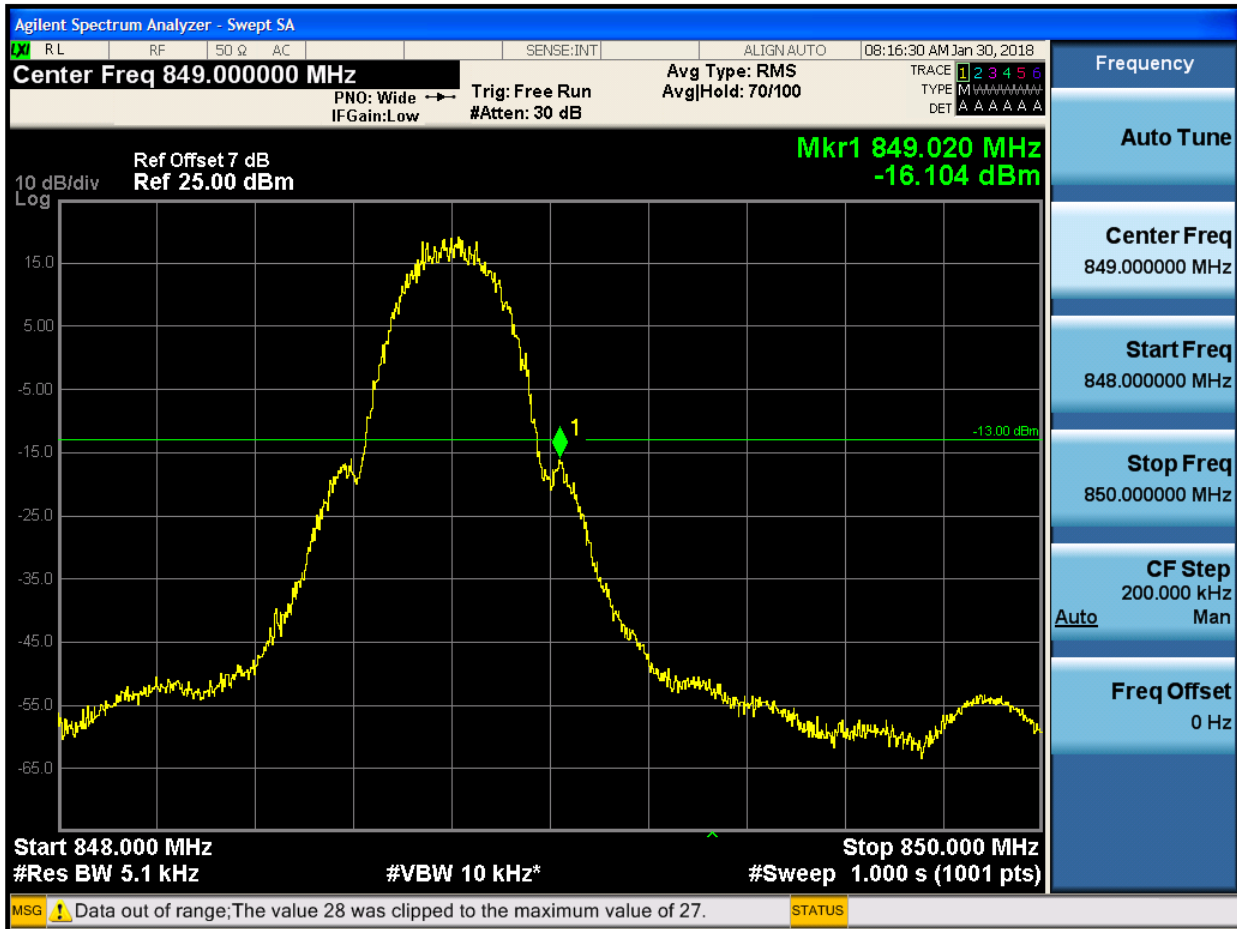
5.1.1.1 Test Mode = GSM/TM1

5.1.1.1.1 Test Channel = LCH





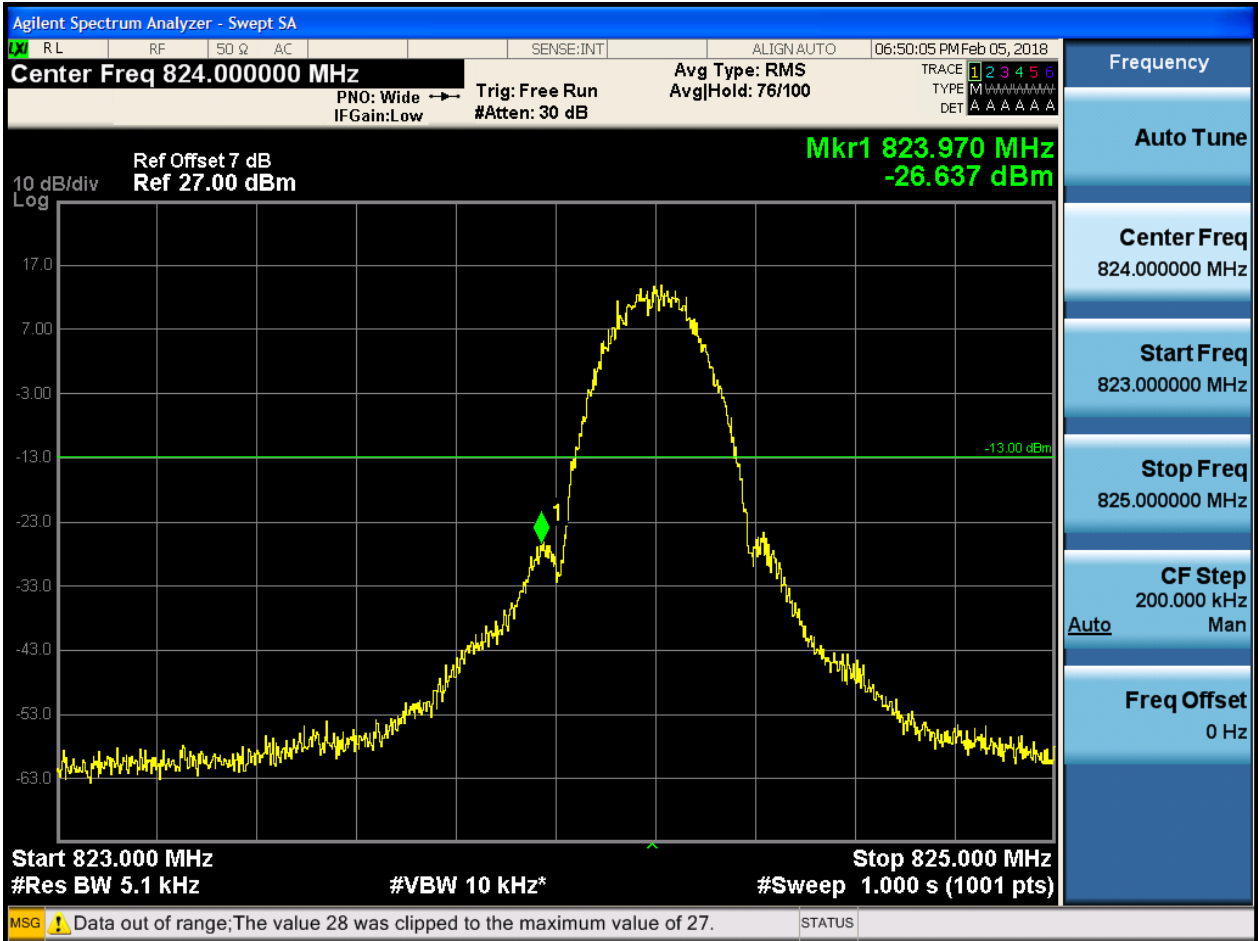
5.1.1.1.2 Test Channel = HCH





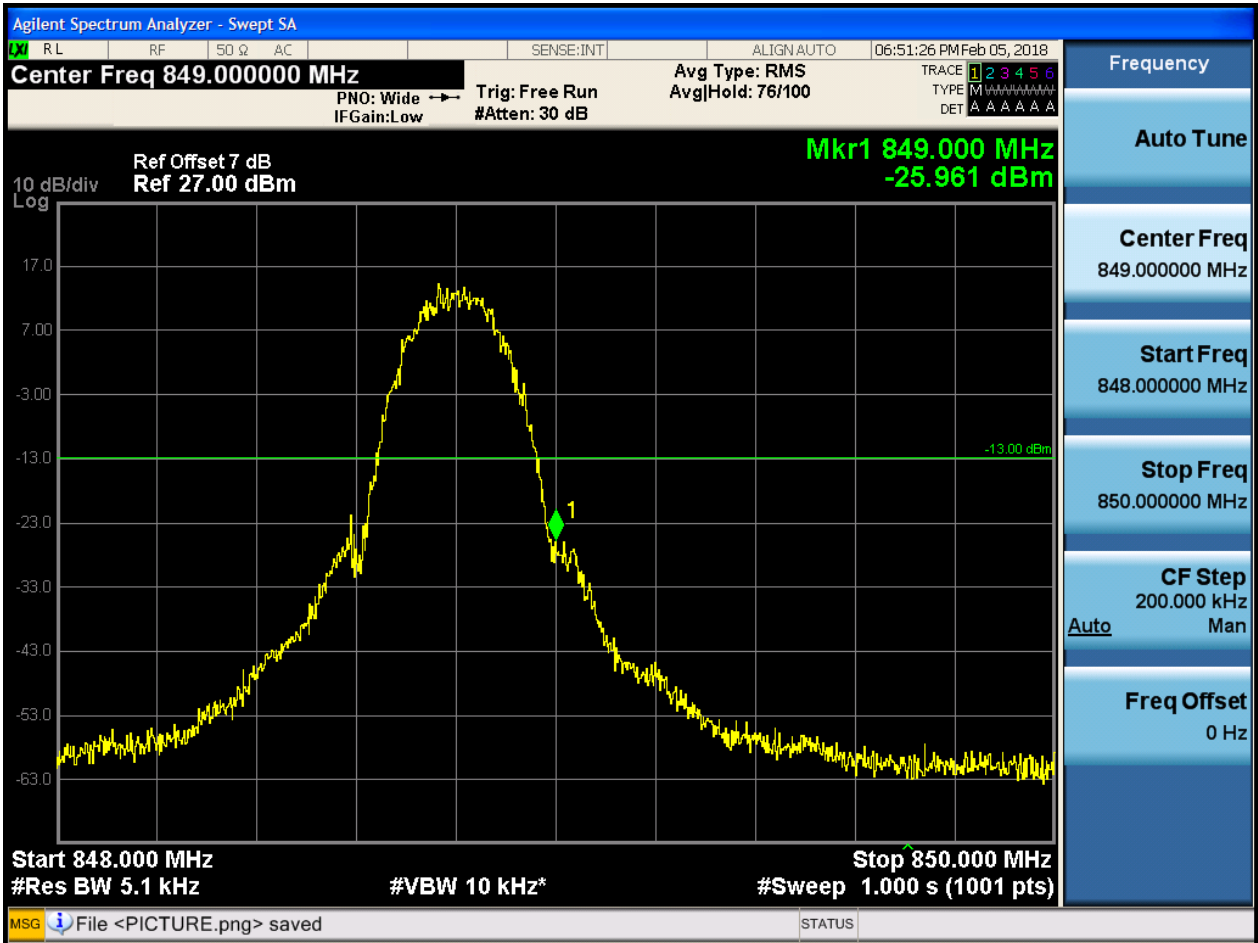
5.1.1.2 Test Mode = GSM/TM2

5.1.1.2.1 Test Channel = LCH





5.1.1.2.2 Test Channel = HCH

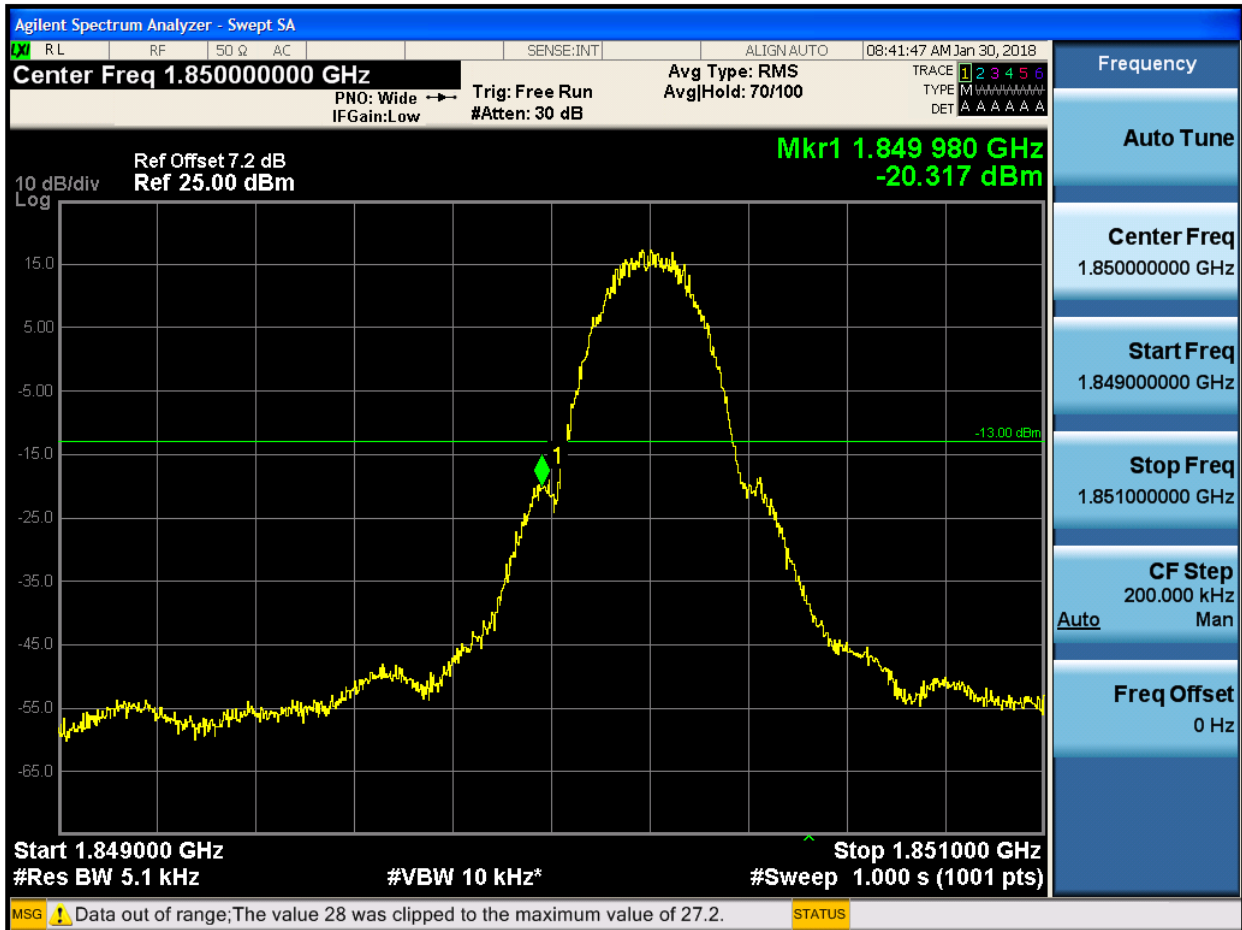




5.1.2 Test Band = GSM1900

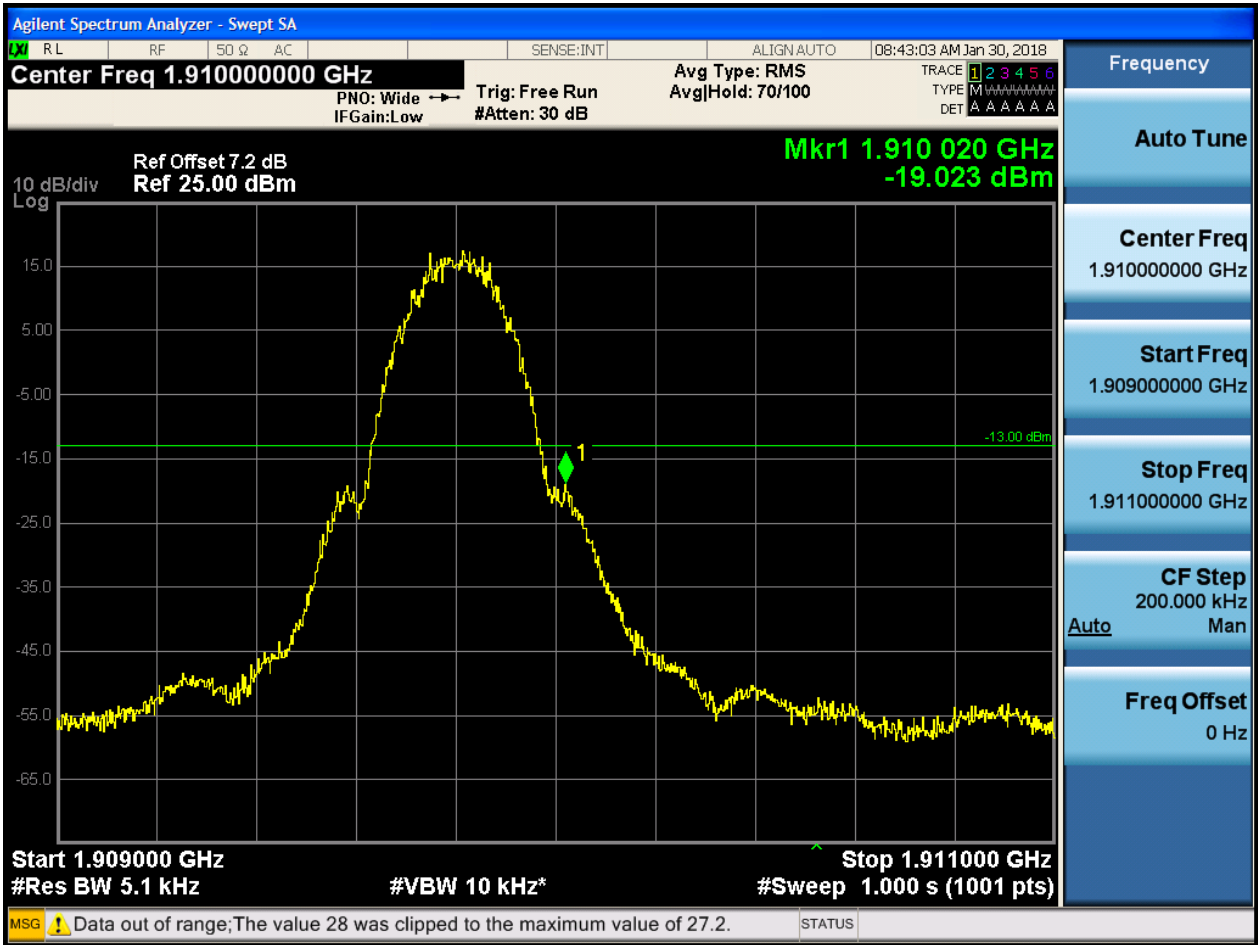
5.1.2.1 Test Mode = GSM/TM1

5.1.2.1.1 Test Channel = LCH

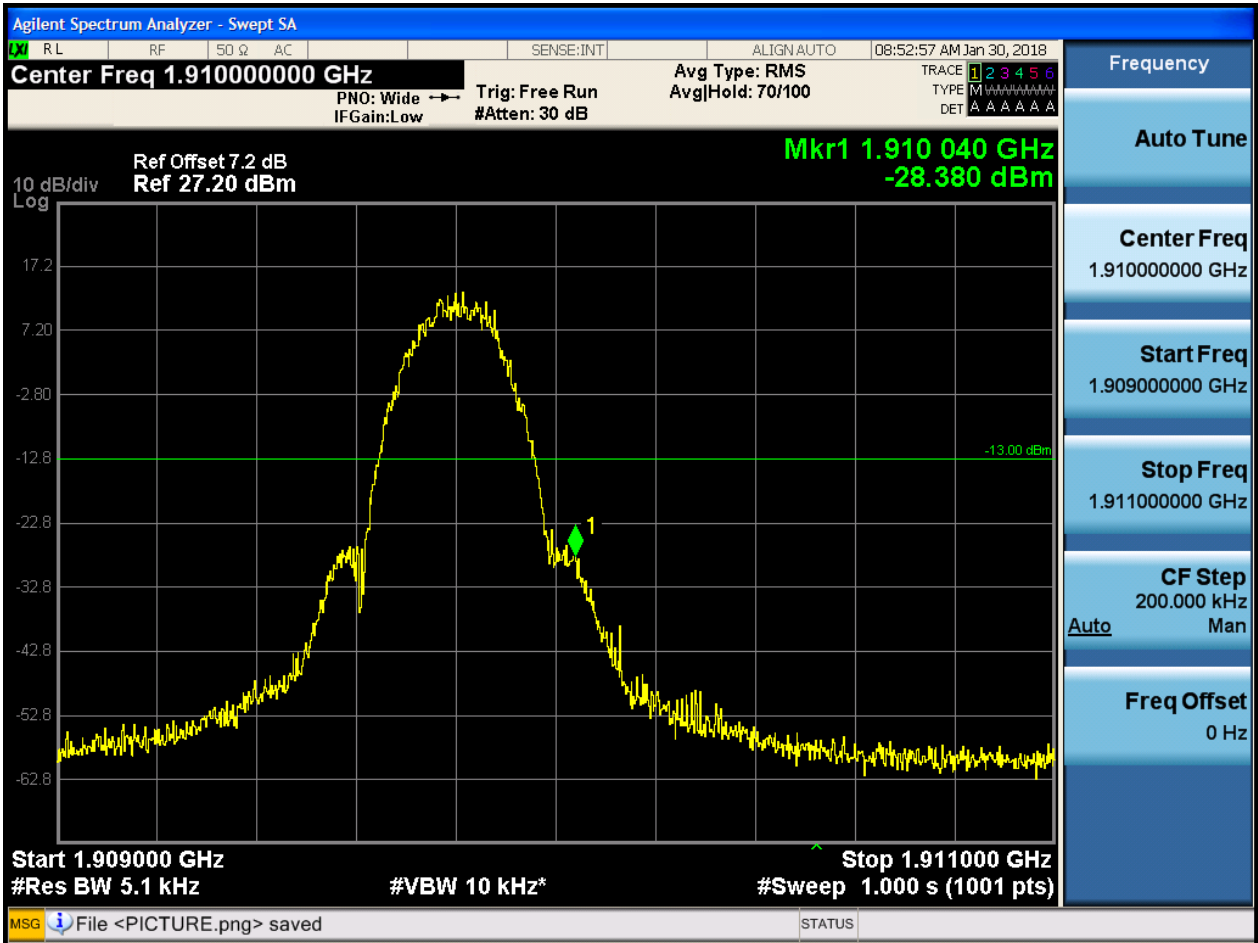




5.1.2.1.2 Test Channel = HCH



5.1.2.2.2 Test Channel = HCH





6Appendix_F: Spurious Emission at Antenna Terminal

NOTE: For the averaged unwanted emissions measurements, the measurement points in each sweep is greater than twice the Span/RBW in order to ensure bin-to-bin spacing of $< RBW/2$ so that narrowband signals are not lost between frequency bins. As to the present test item, the "Measurement Points = $k * (Span / RBW)$ " with k between 4 and 5, which results in an acceptable level error of less than 0.5 dB.

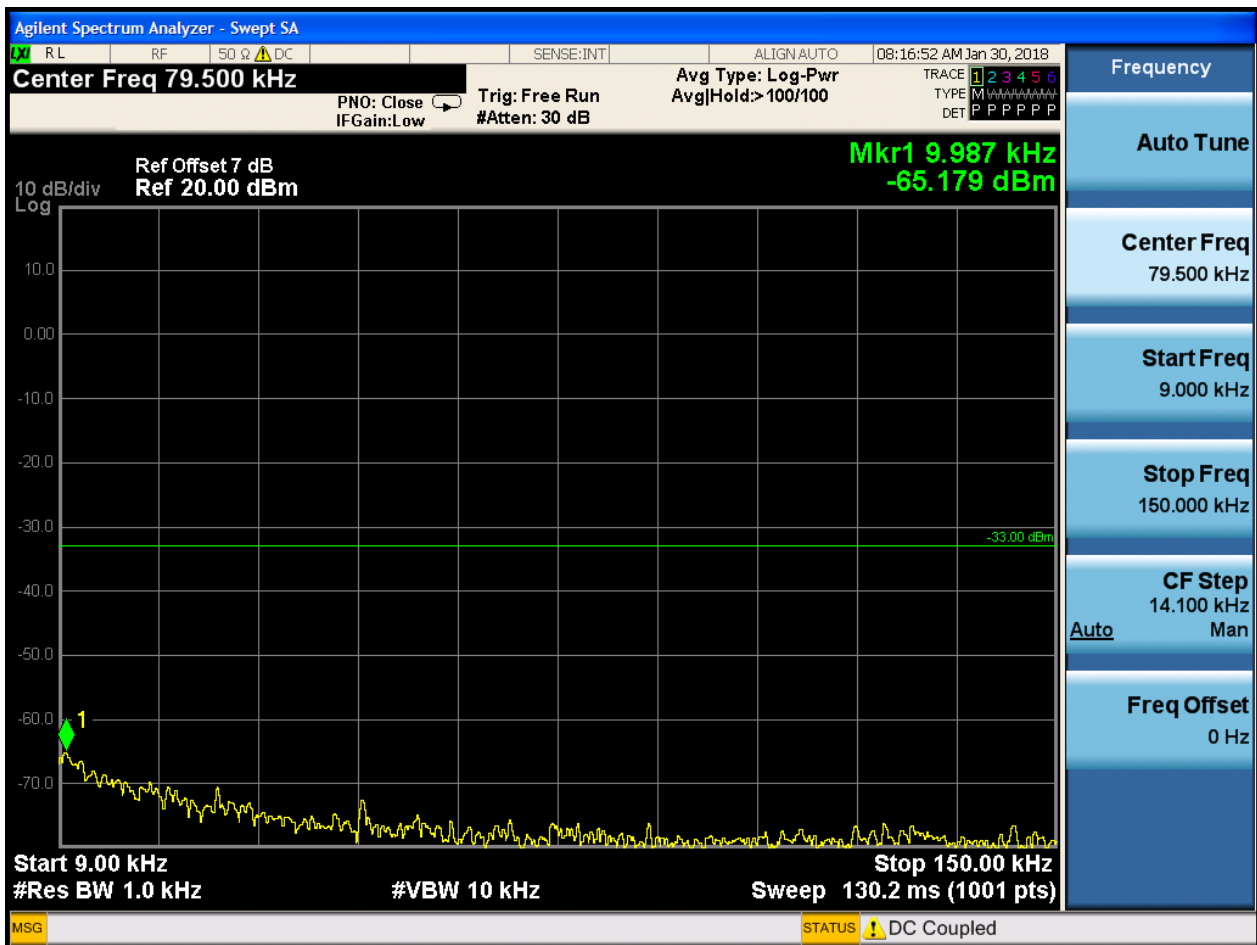
Part I - Test Plots

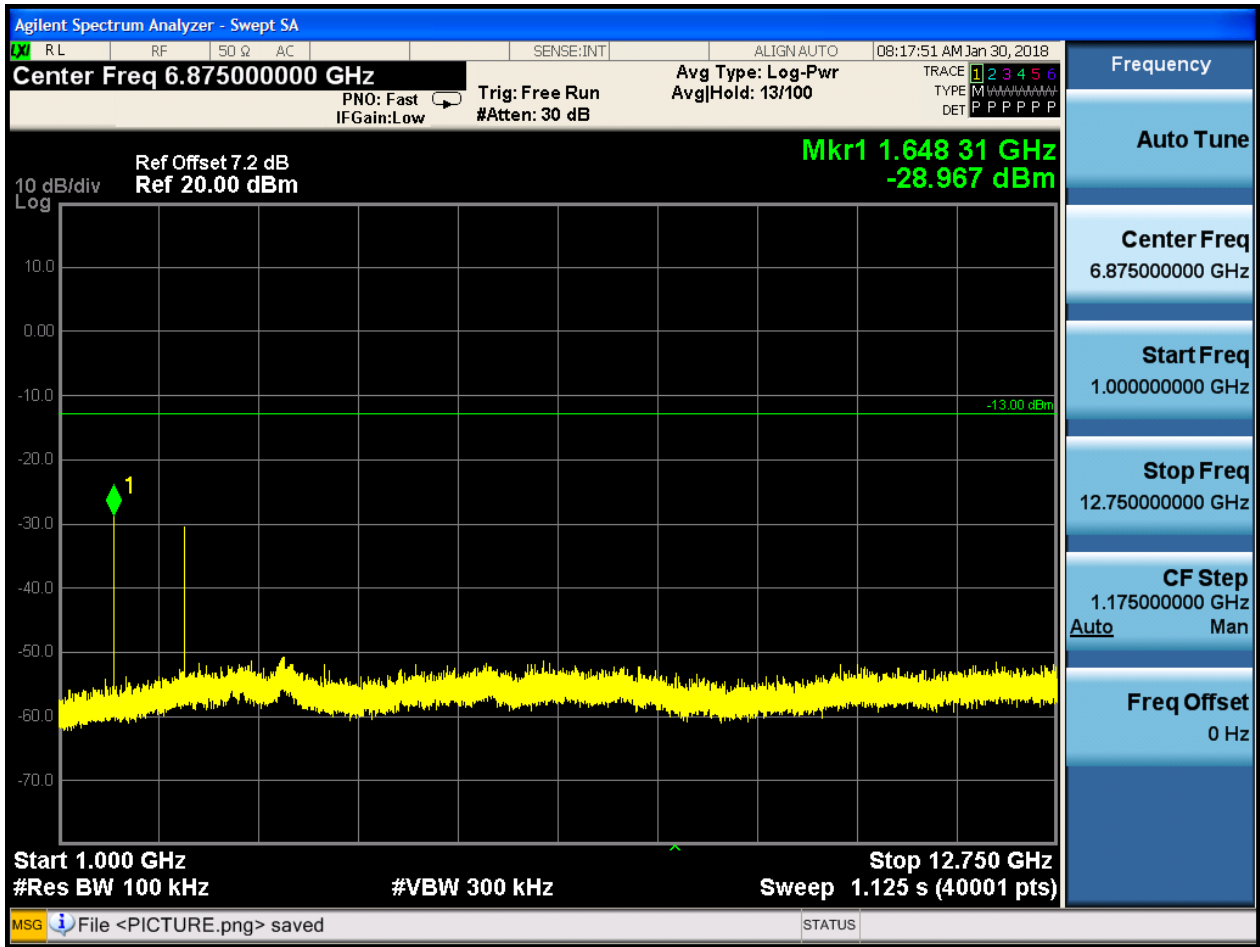
6.1 For GSM

6.1.1 Test Band = GSM850

6.1.1.1 Test Mode = GSM/TM1

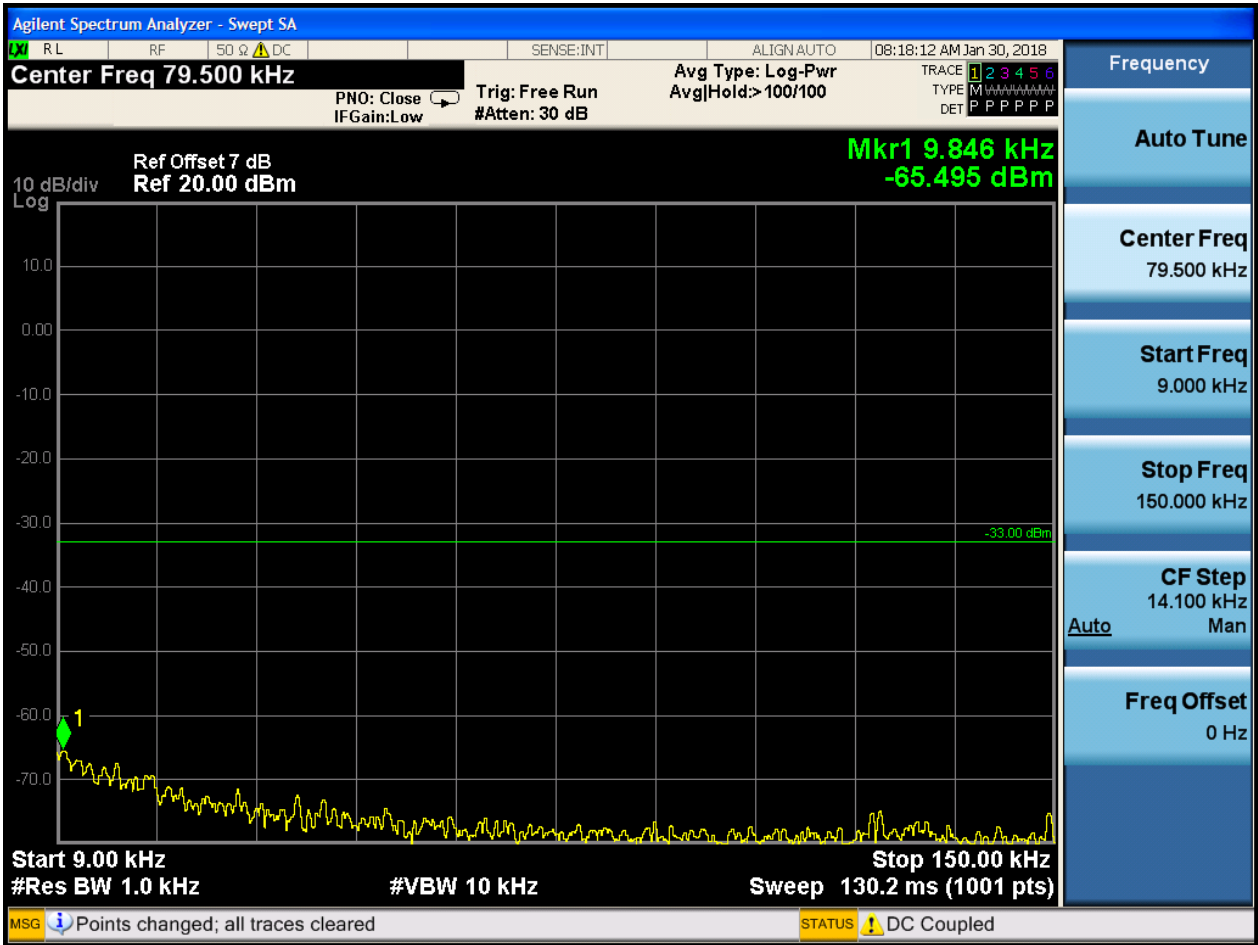
6.1.1.1.1 Test Channel = LCH

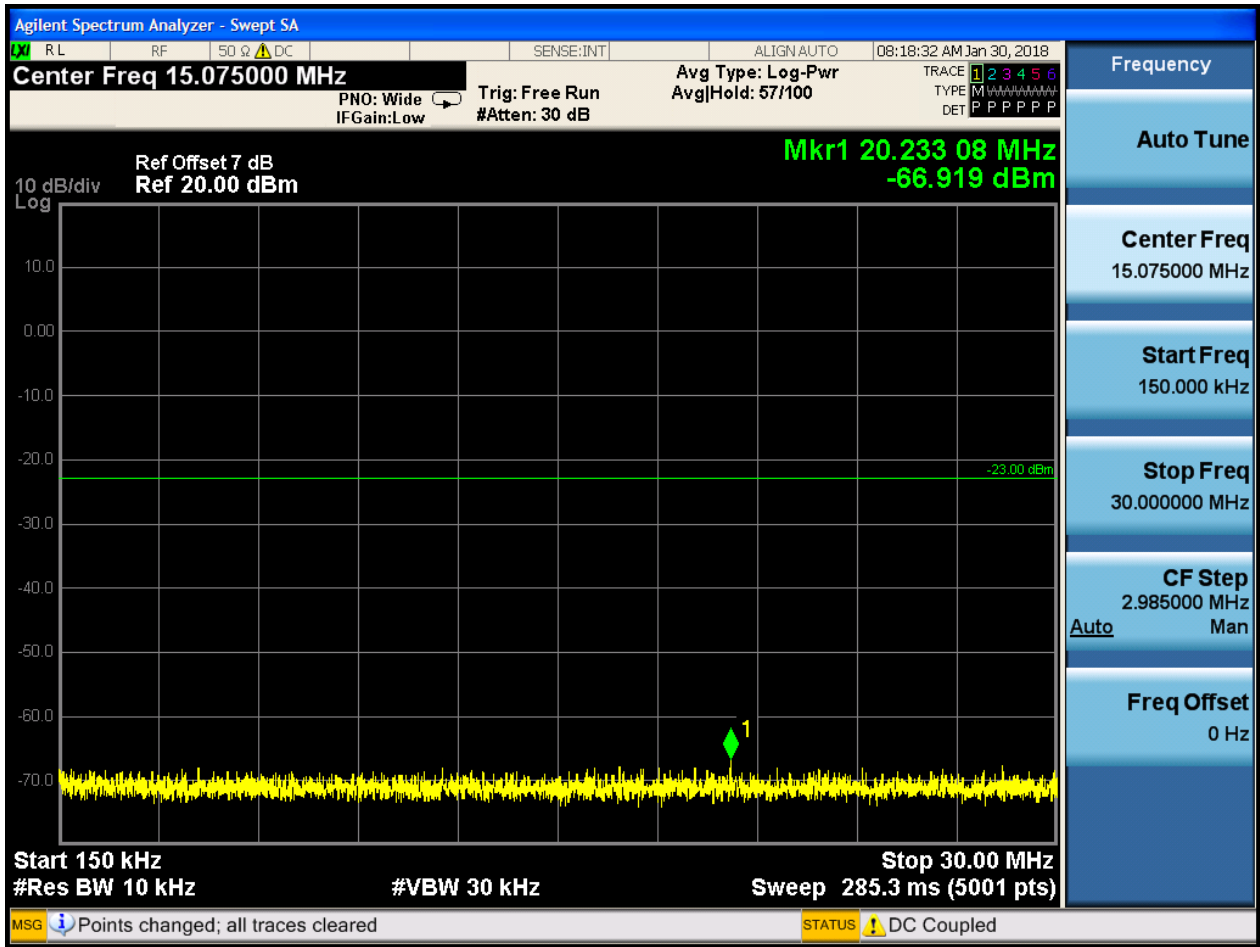


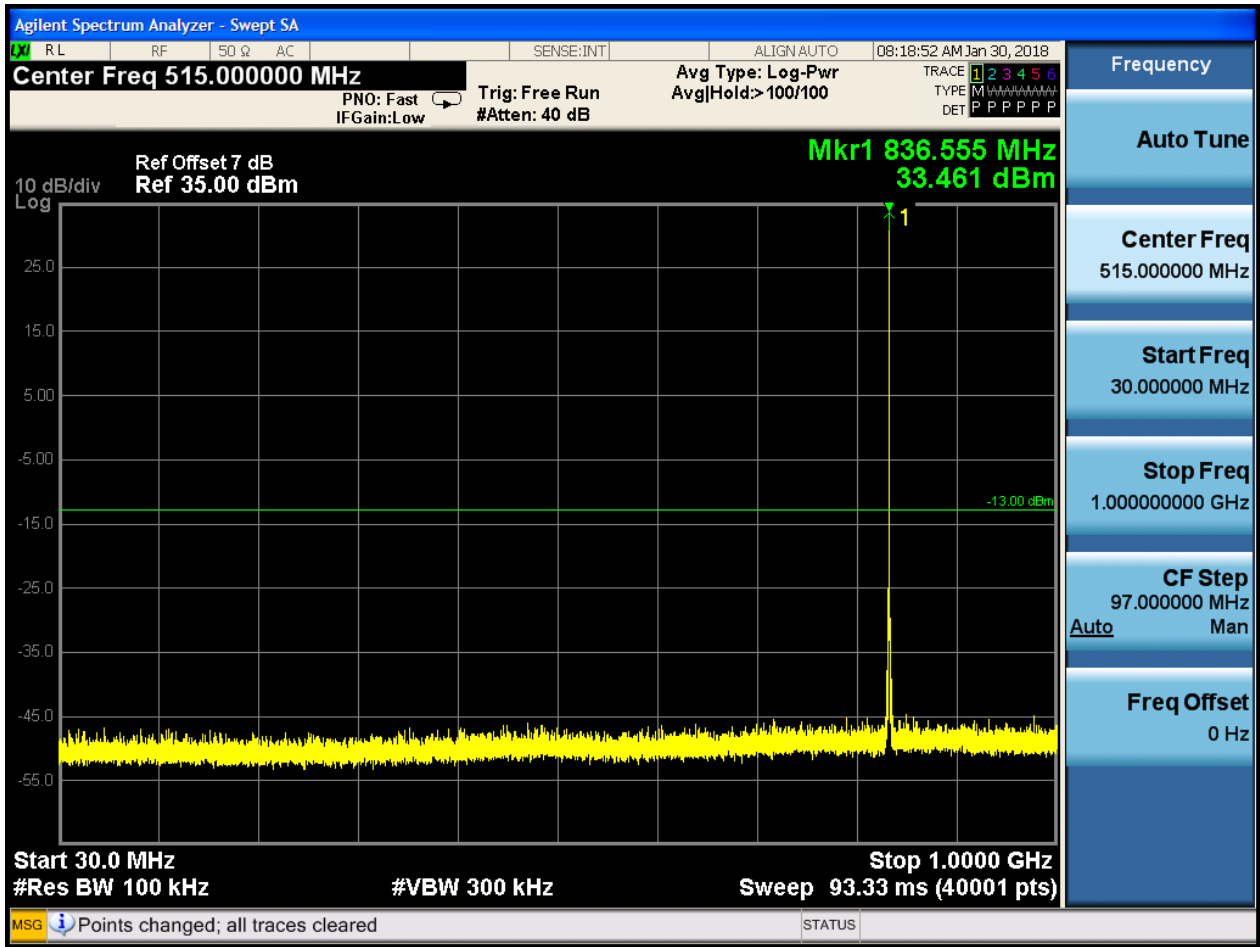




6.1.1.1.2 Test Channel = MCH

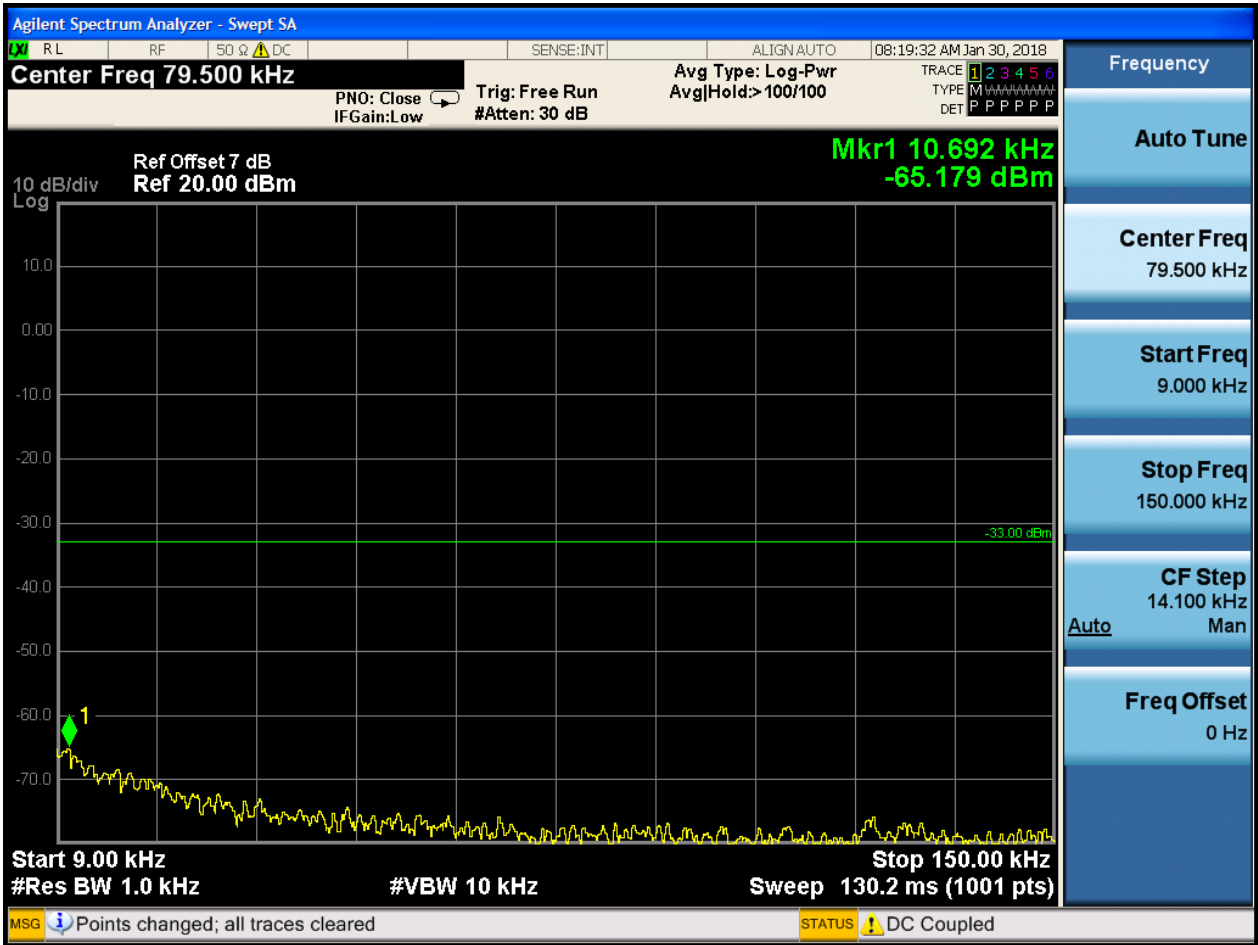


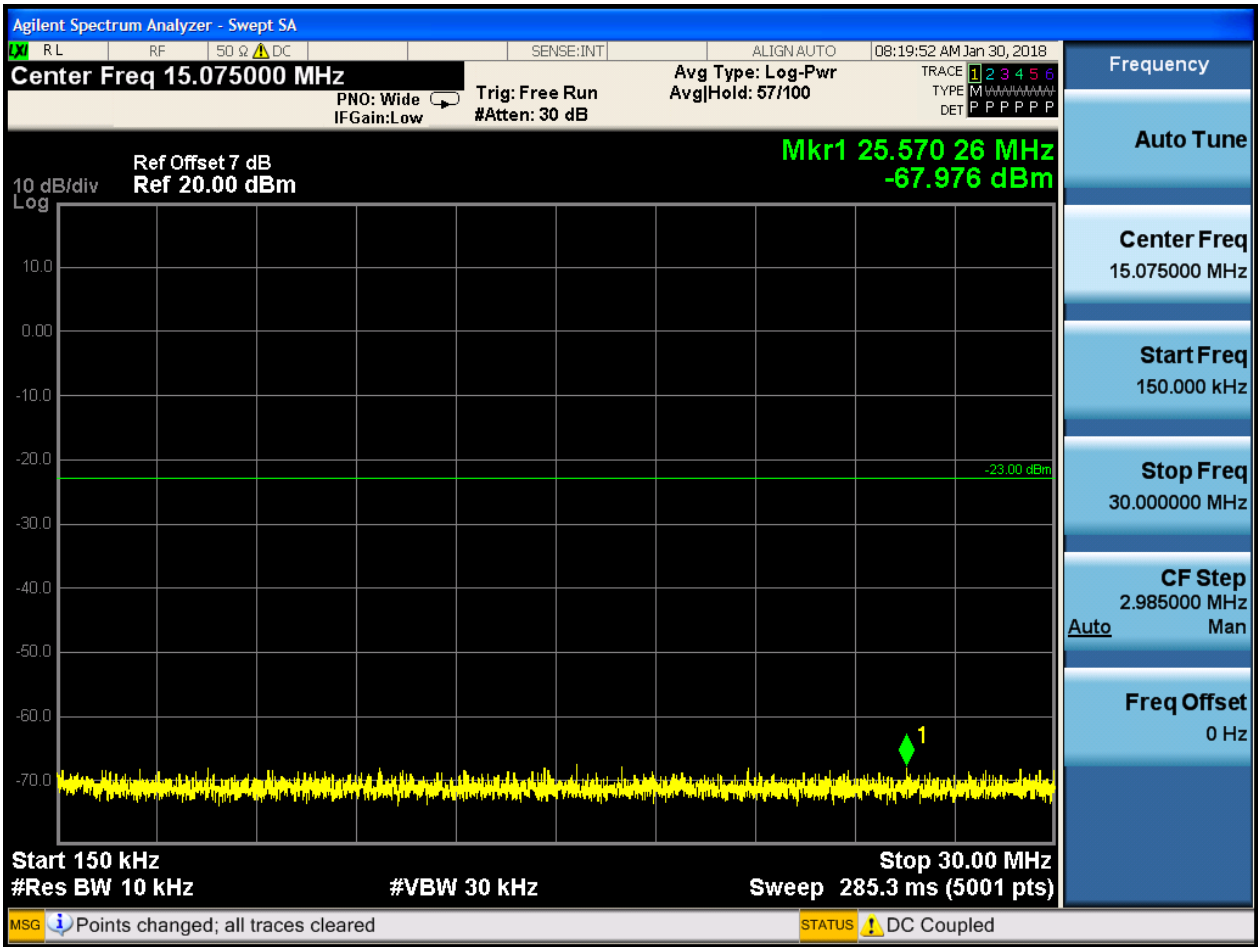


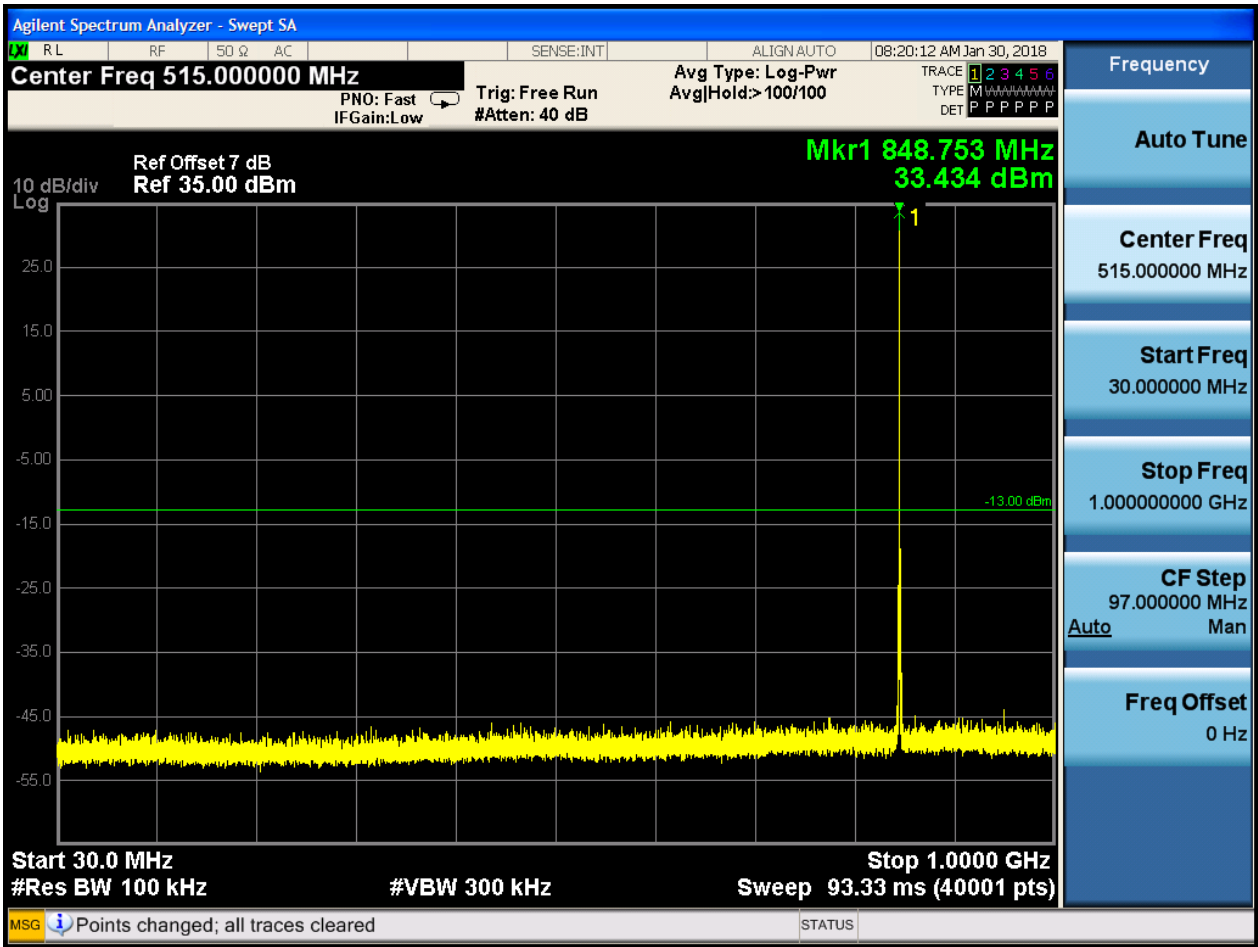




6.1.1.1.3 Test Channel = HCH



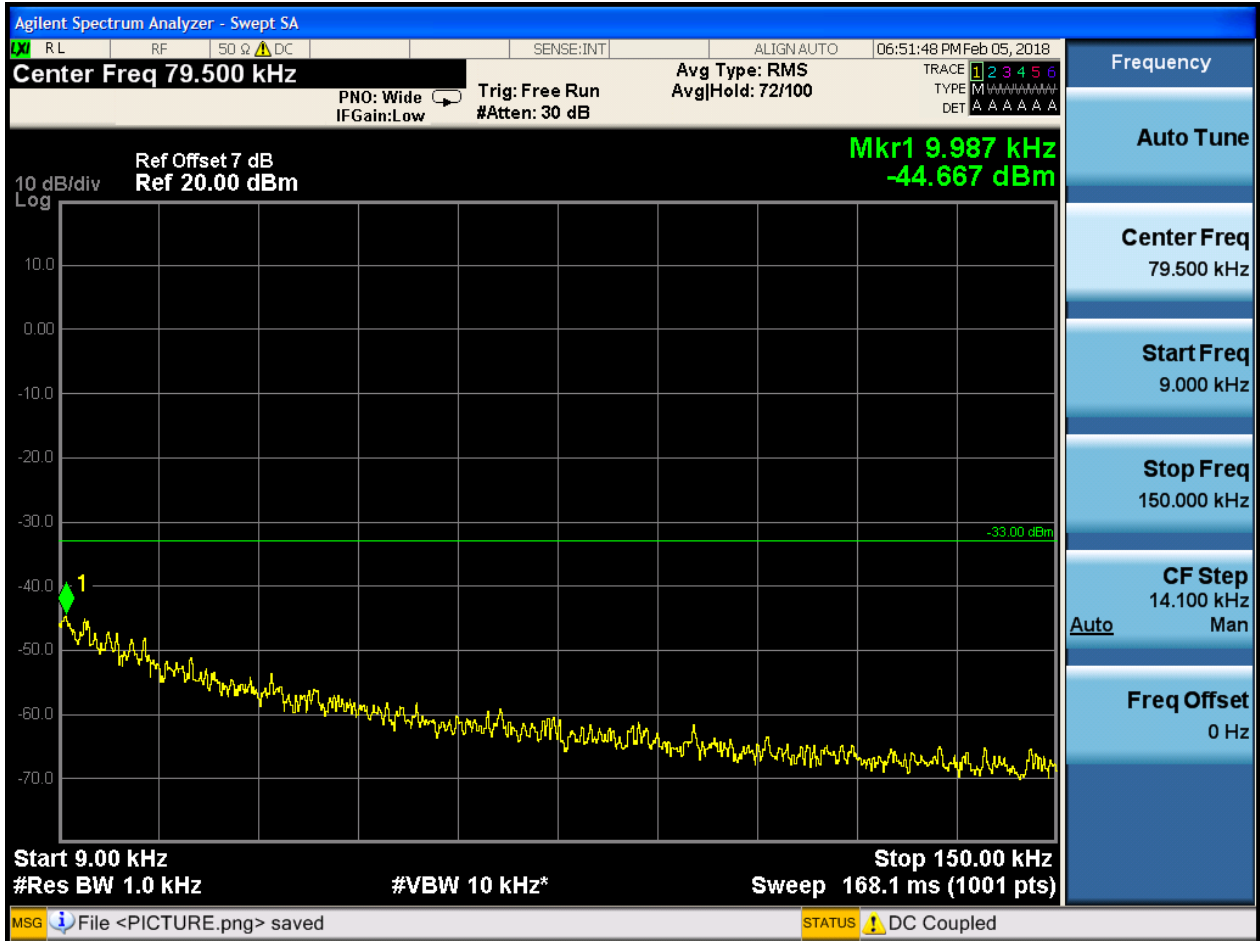


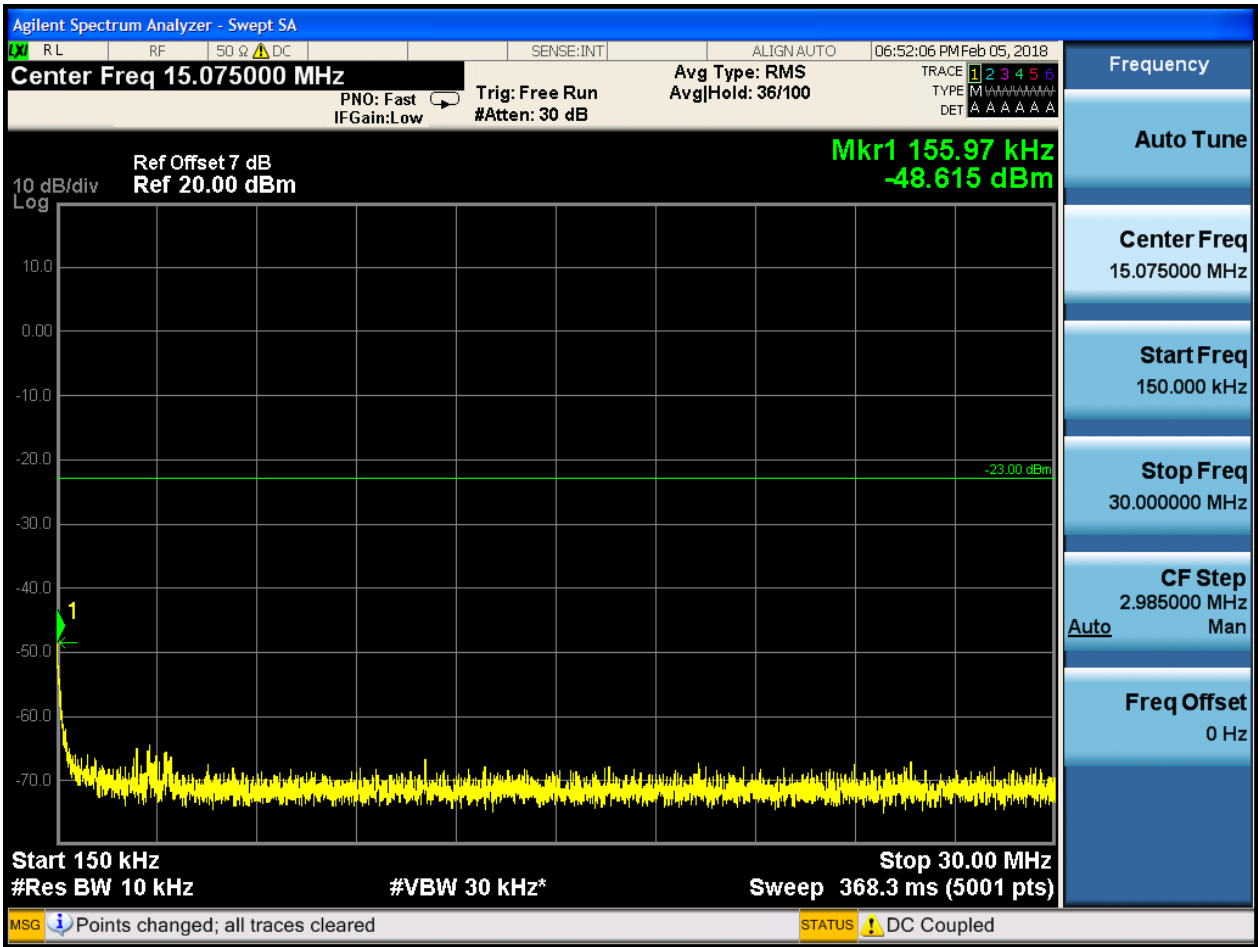


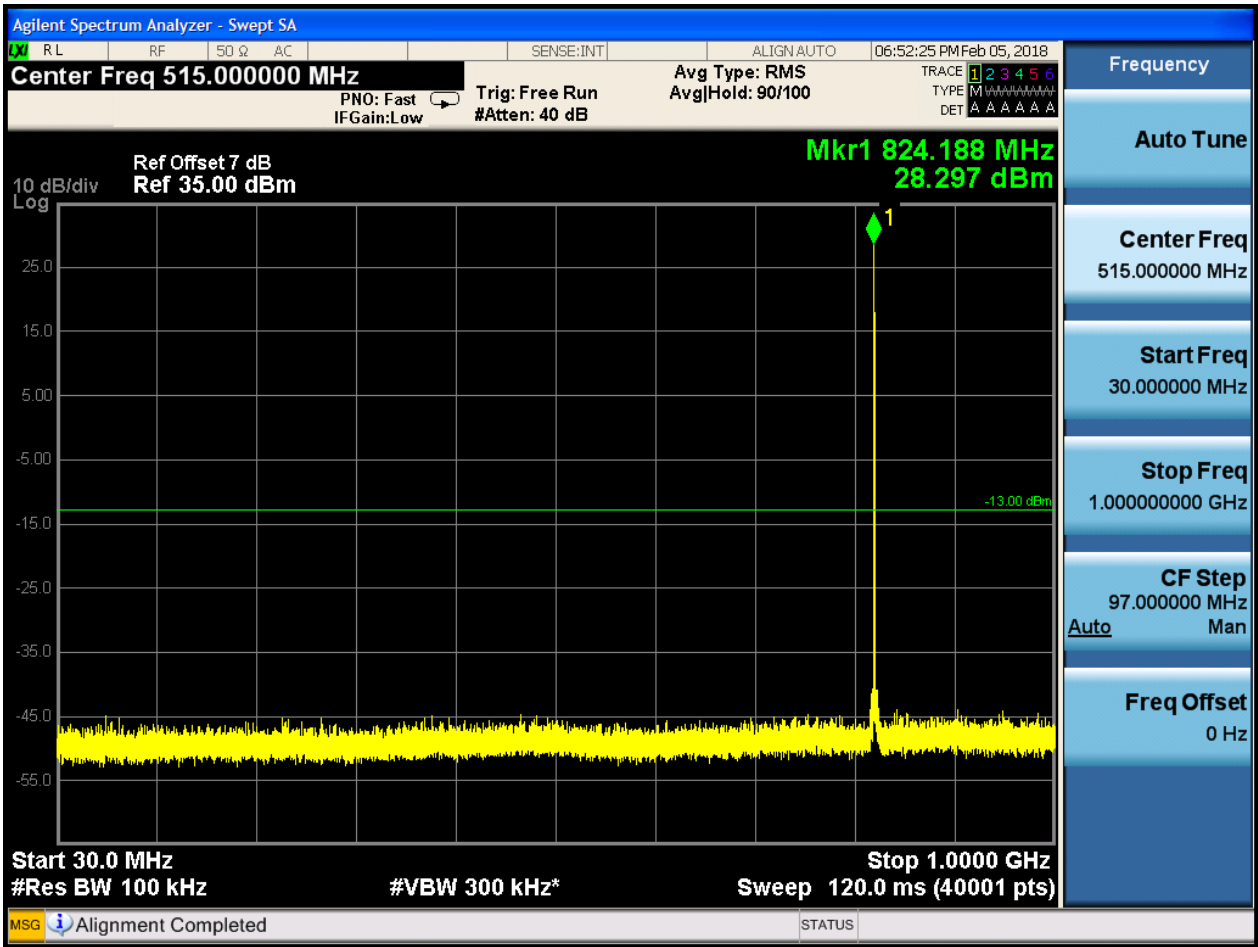


6.1.1.2 Test Mode = GSM/TM2

6.1.1.2.1 Test Channel = LCH

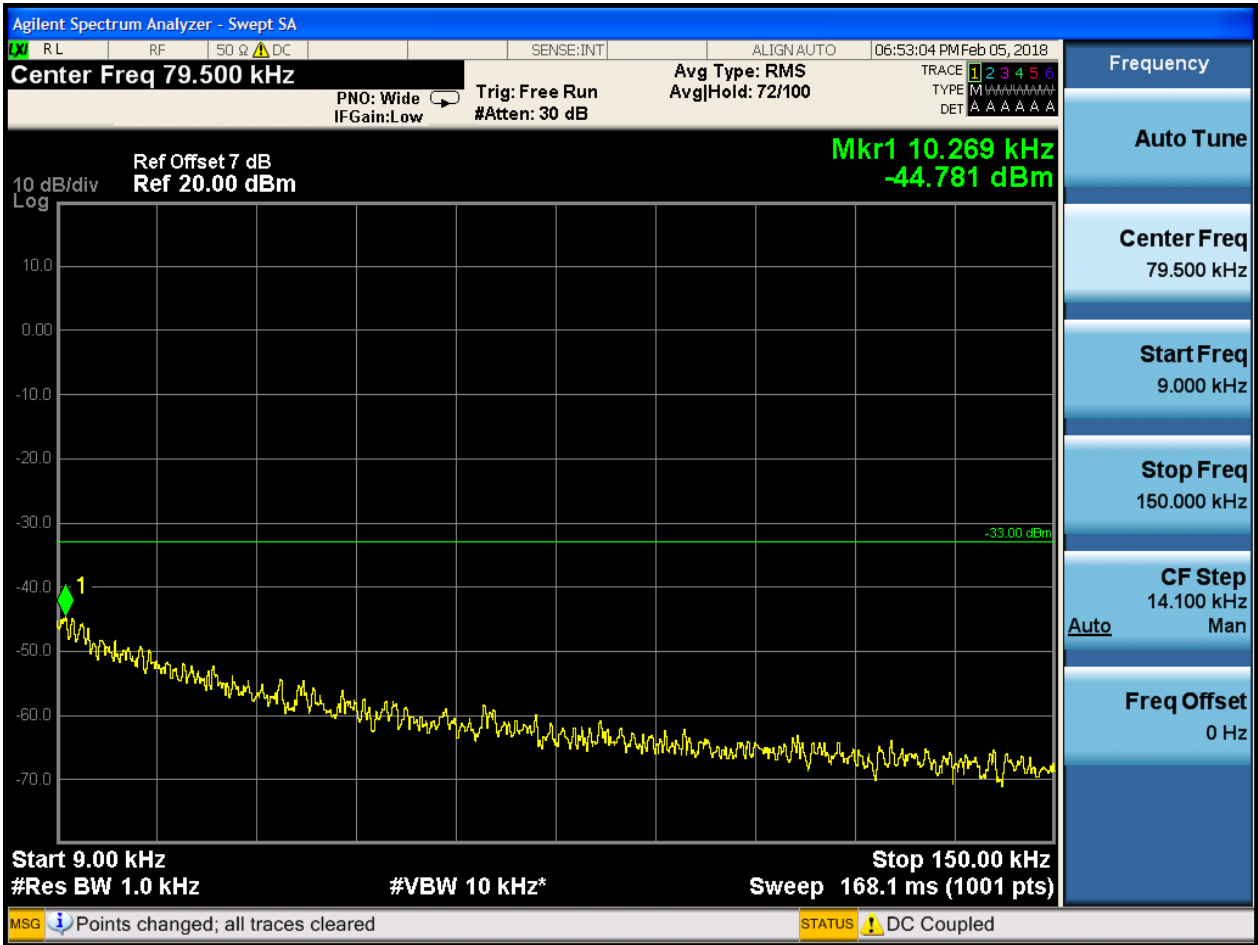


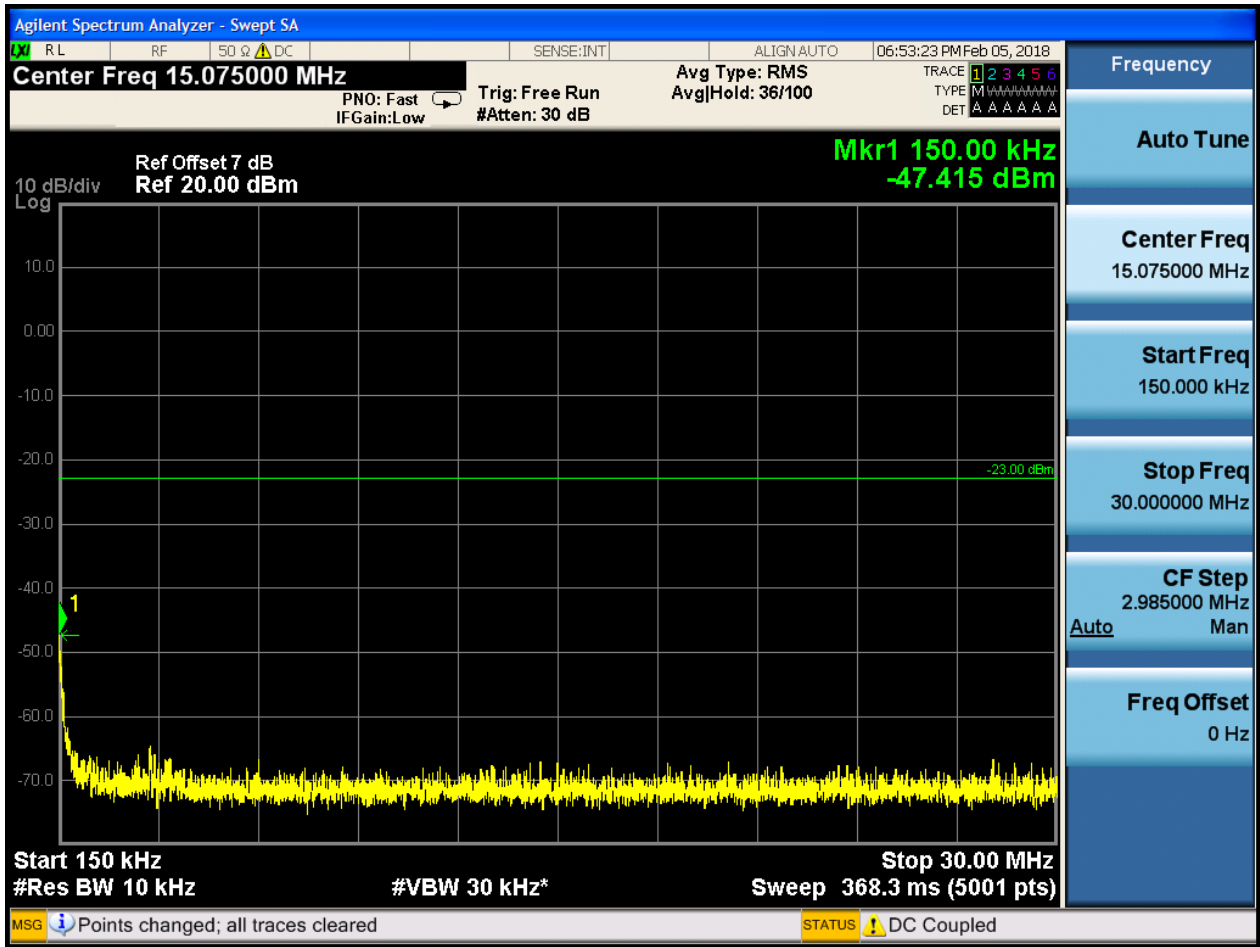


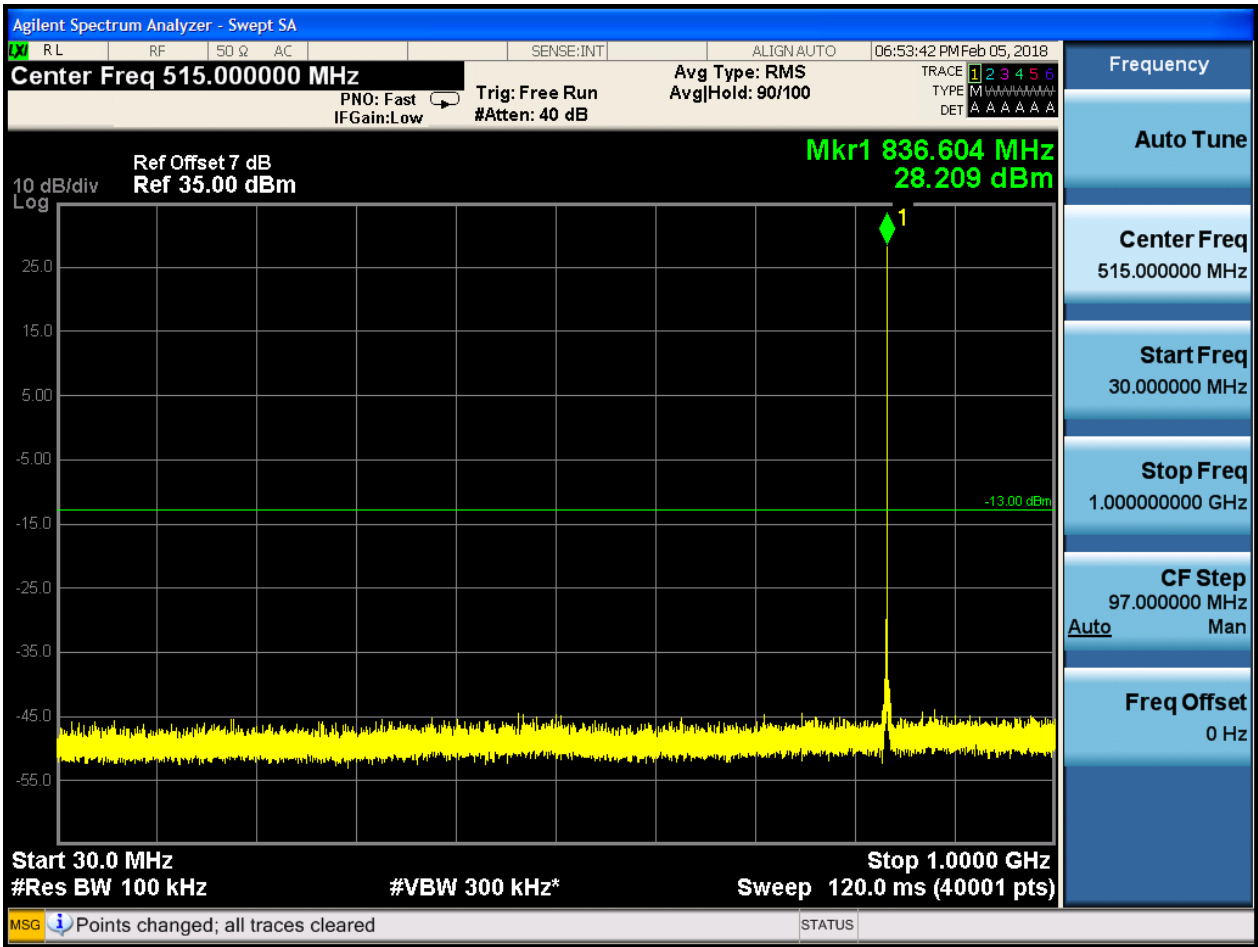




6.1.1.2.2 Test Channel = MCH

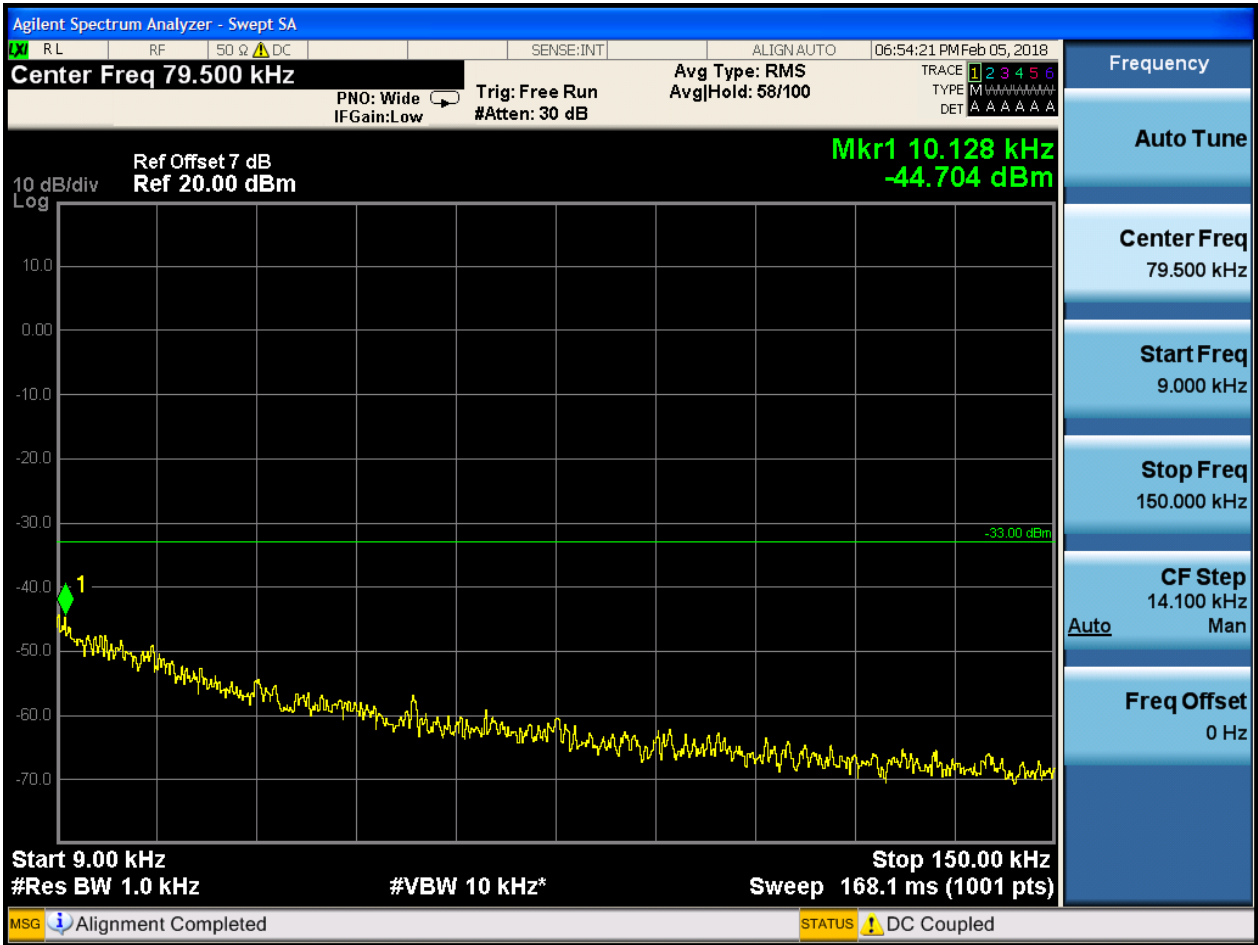


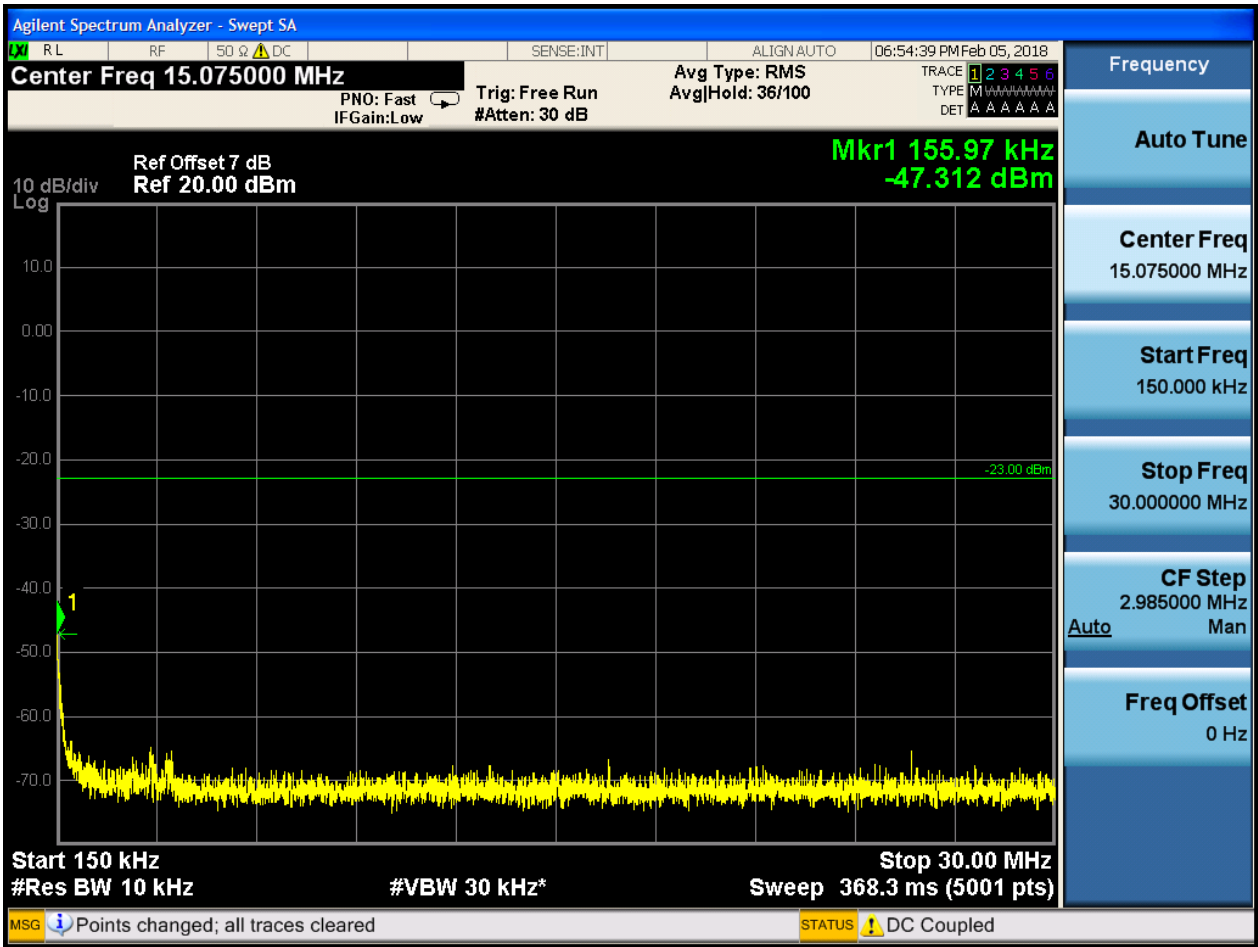


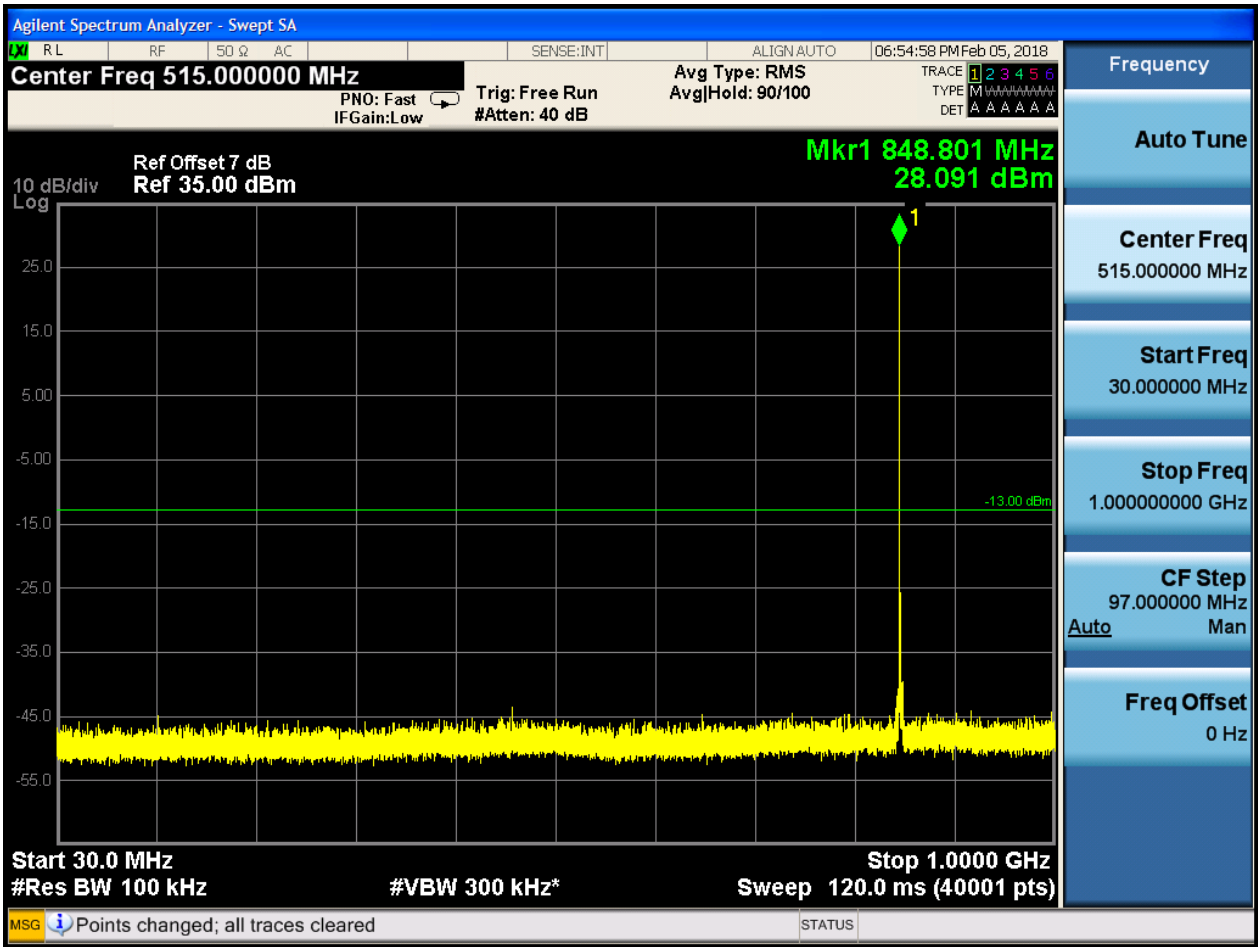


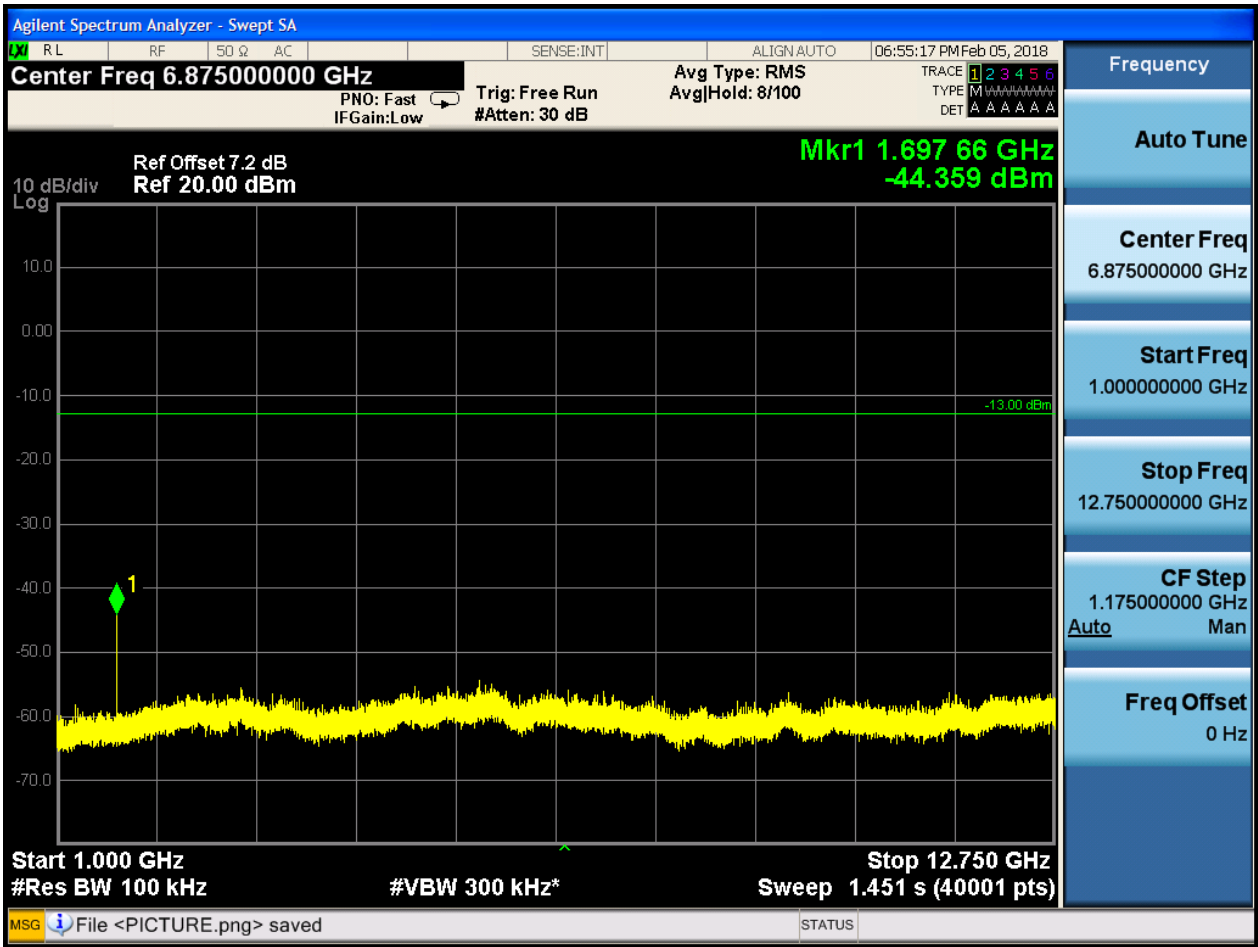


6.1.1.2.3 Test Channel = HCH









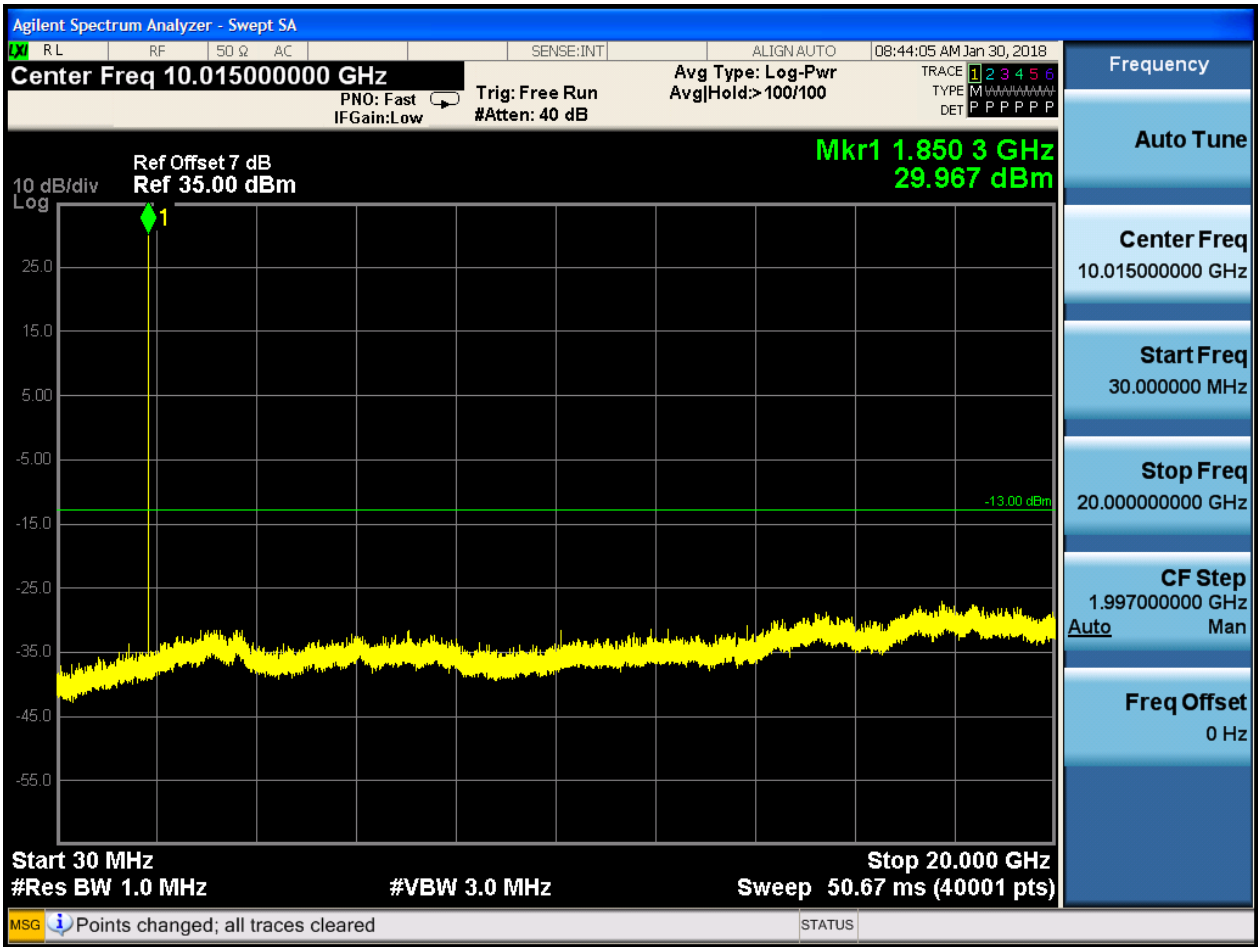


6.1.2 Test Band = GSM1900

6.1.2.1 Test Mode = GSM/TM1

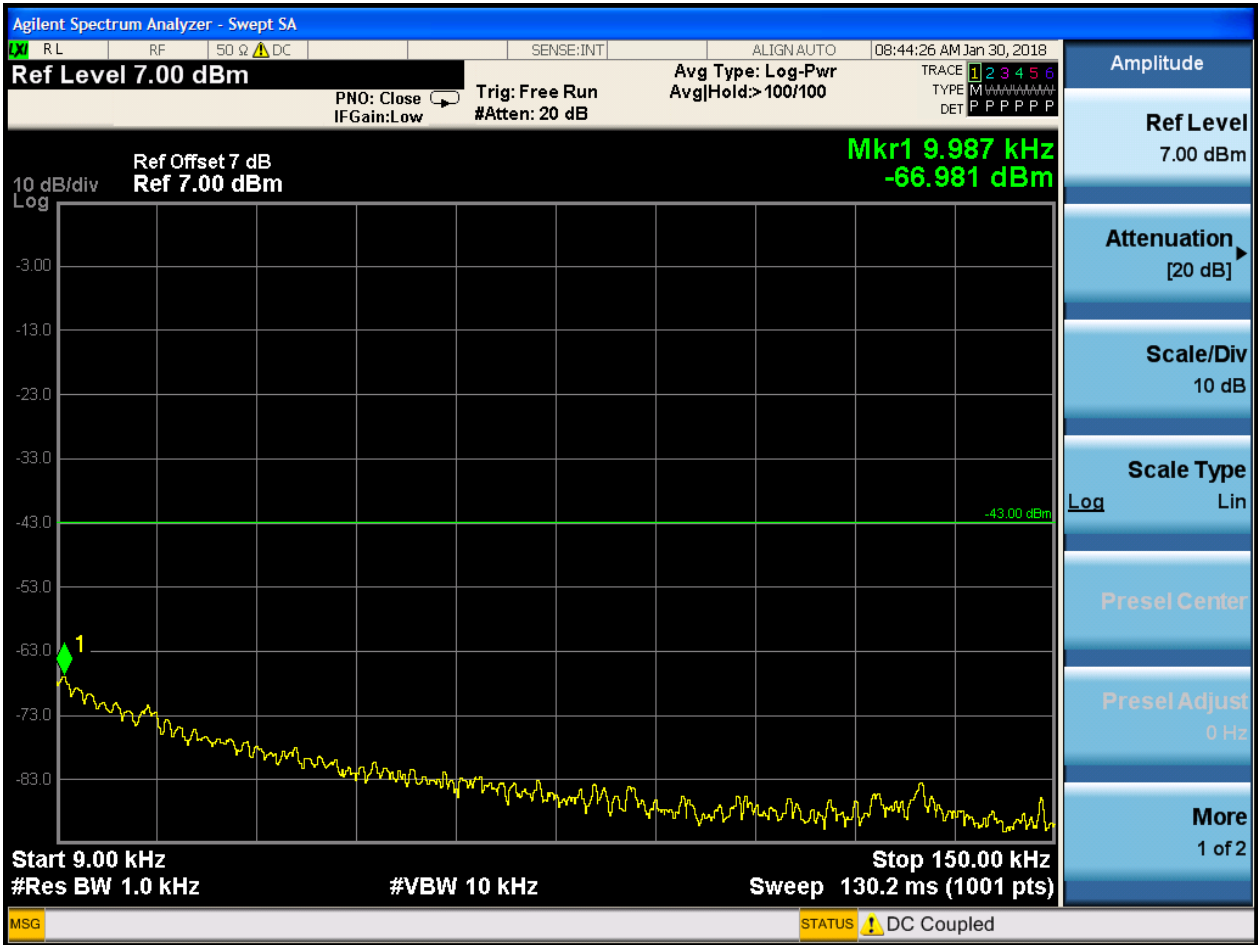
6.1.2.1.1 Test Channel = LCH







6.1.2.1.2 Test Channel = MCH

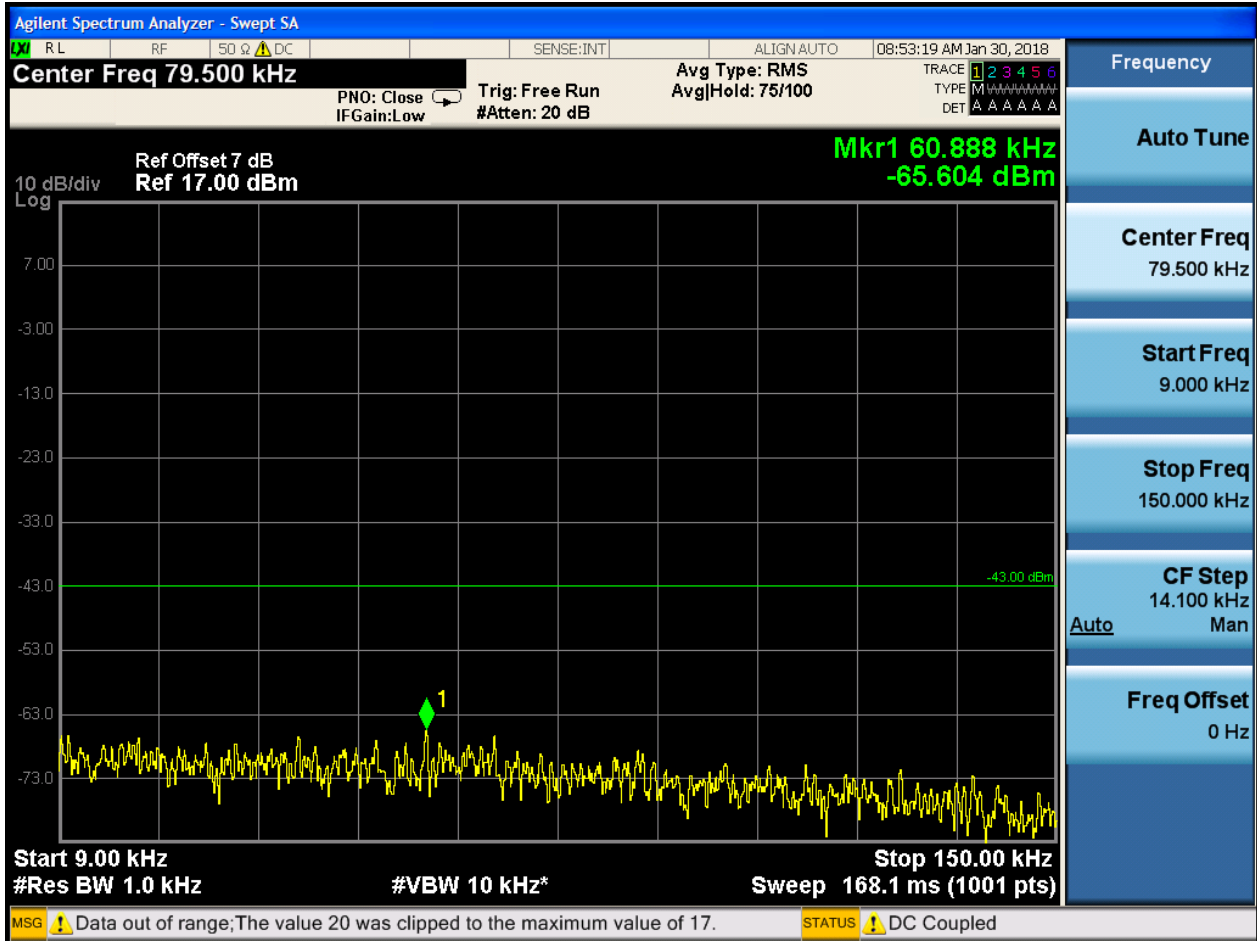


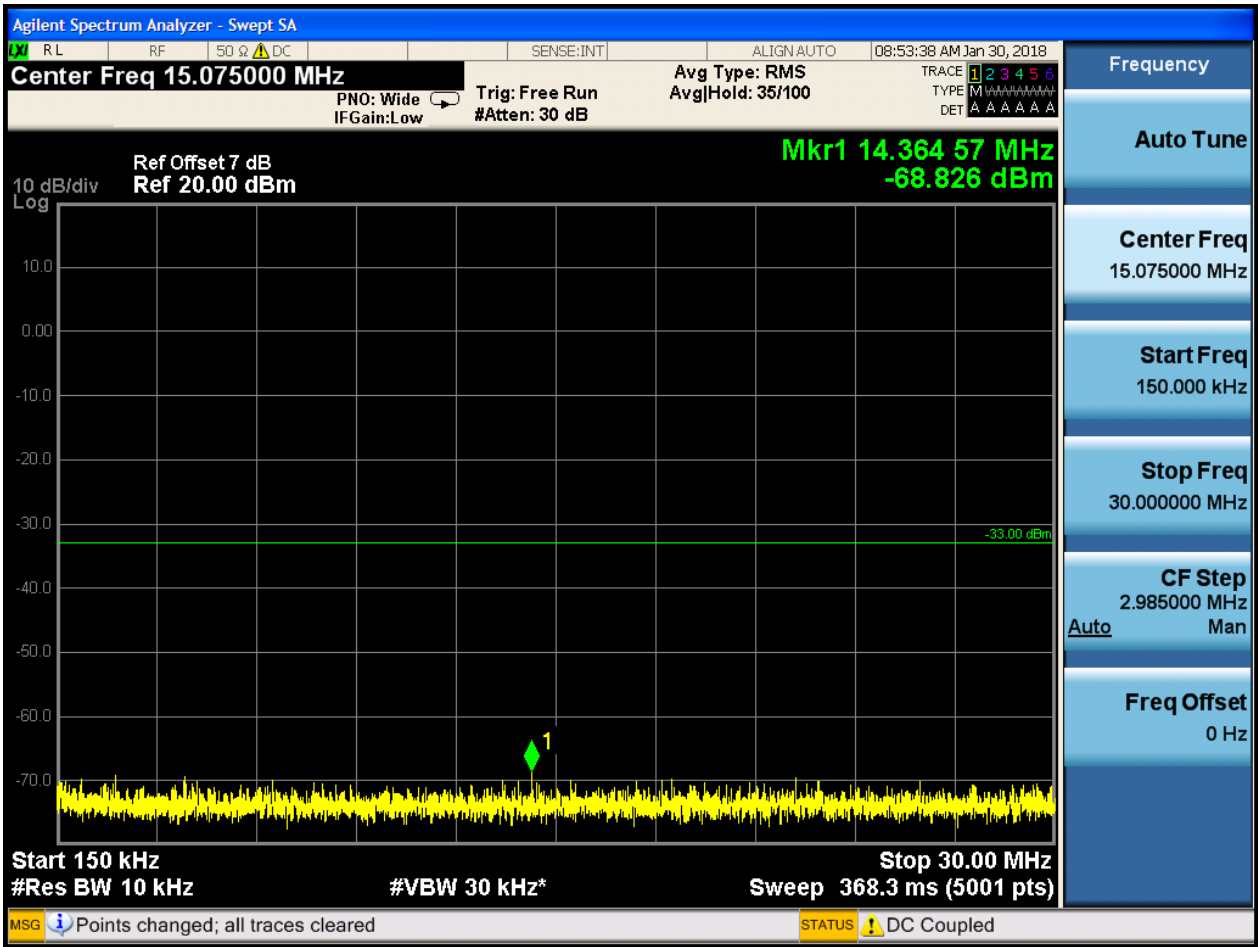


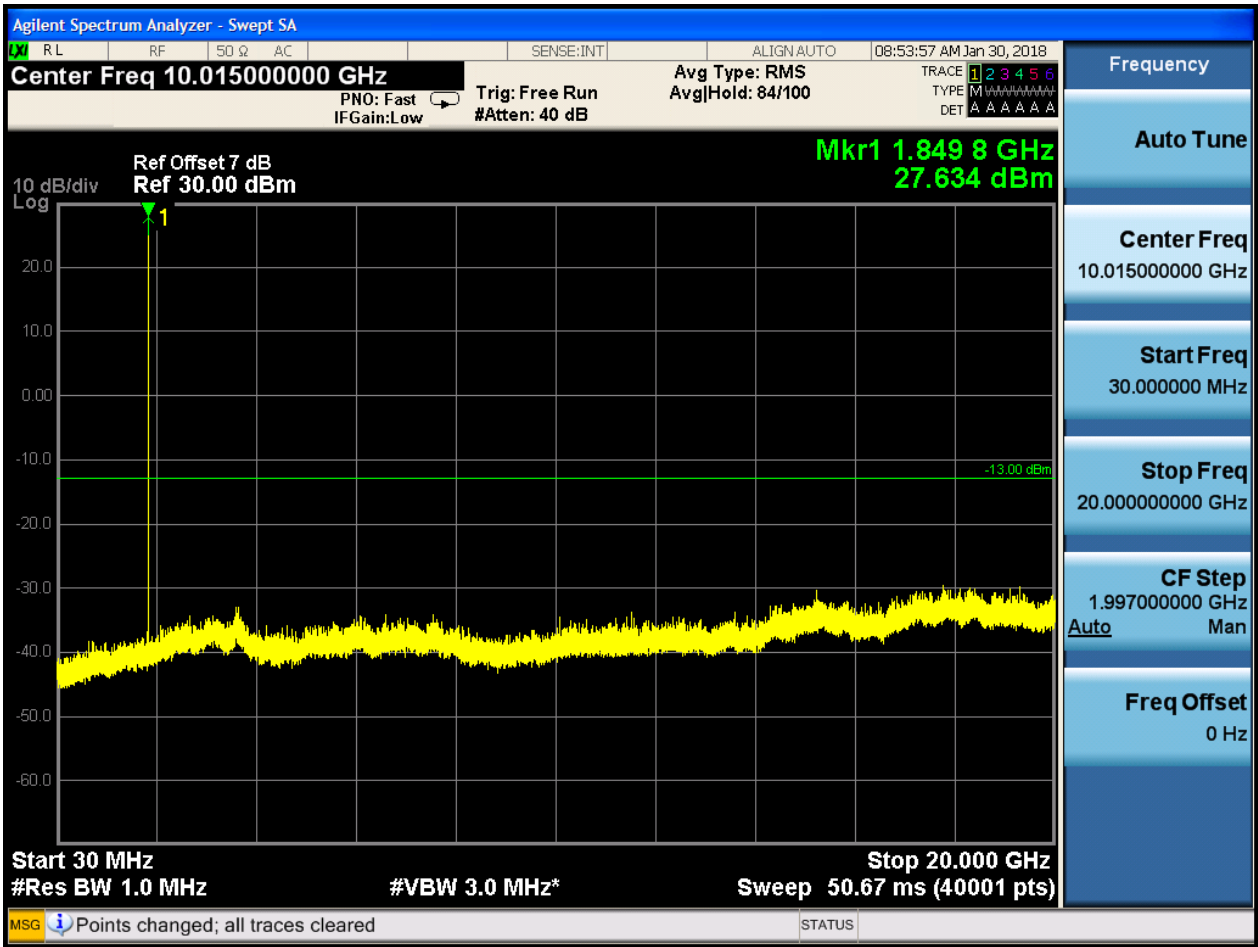


6.1.2.2 Test Mode = GSM/TM2

6.1.2.2.1 Test Channel = LCH

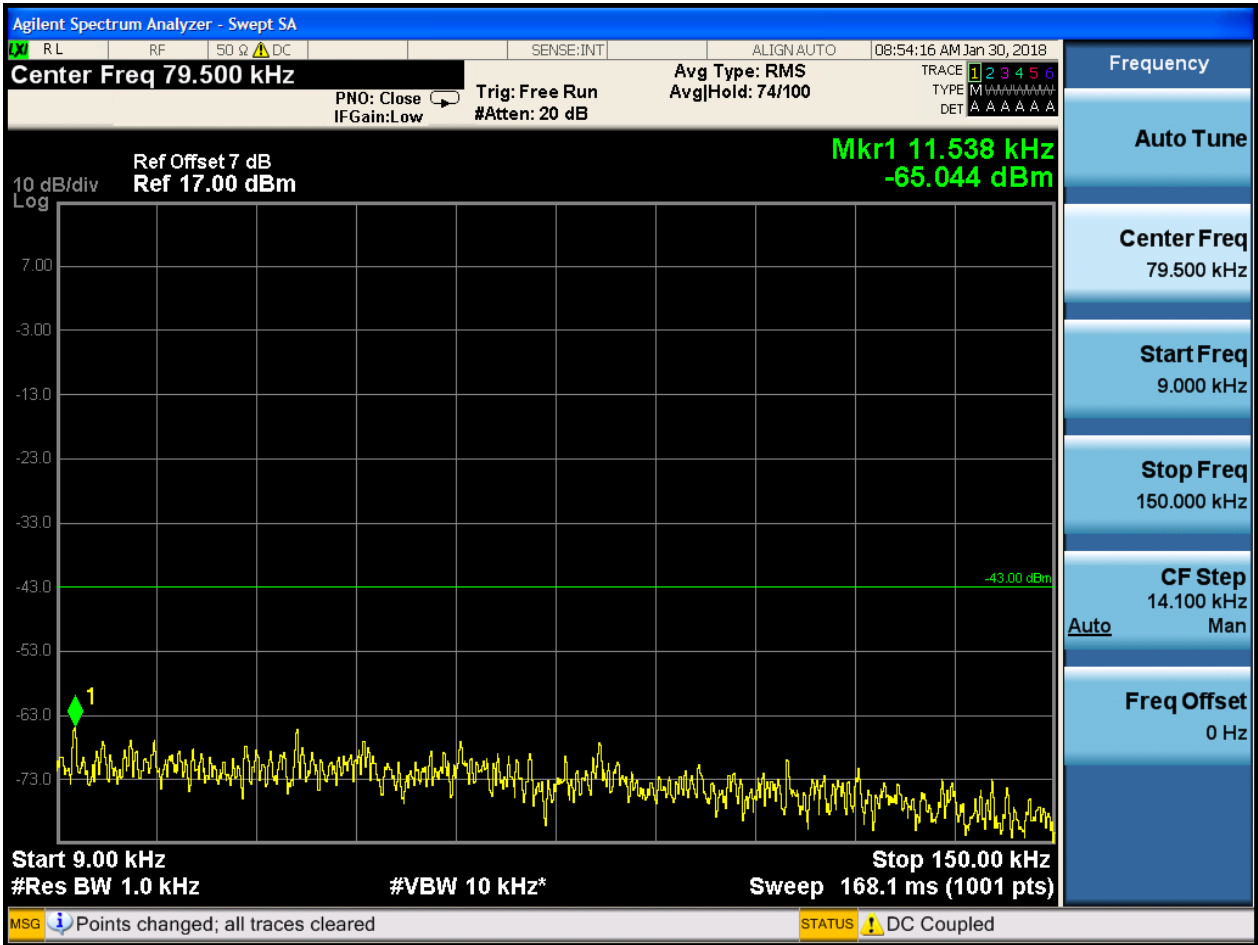


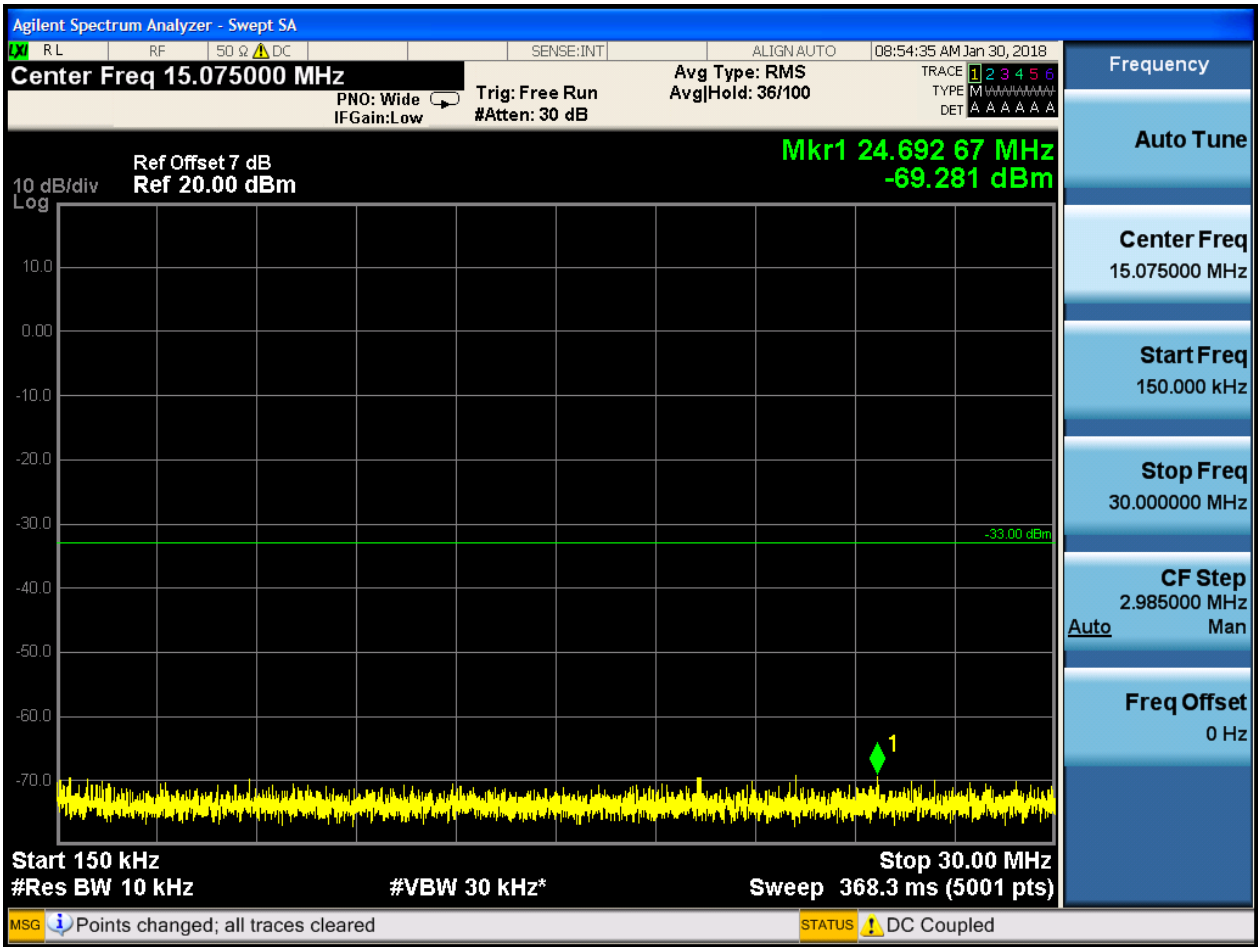


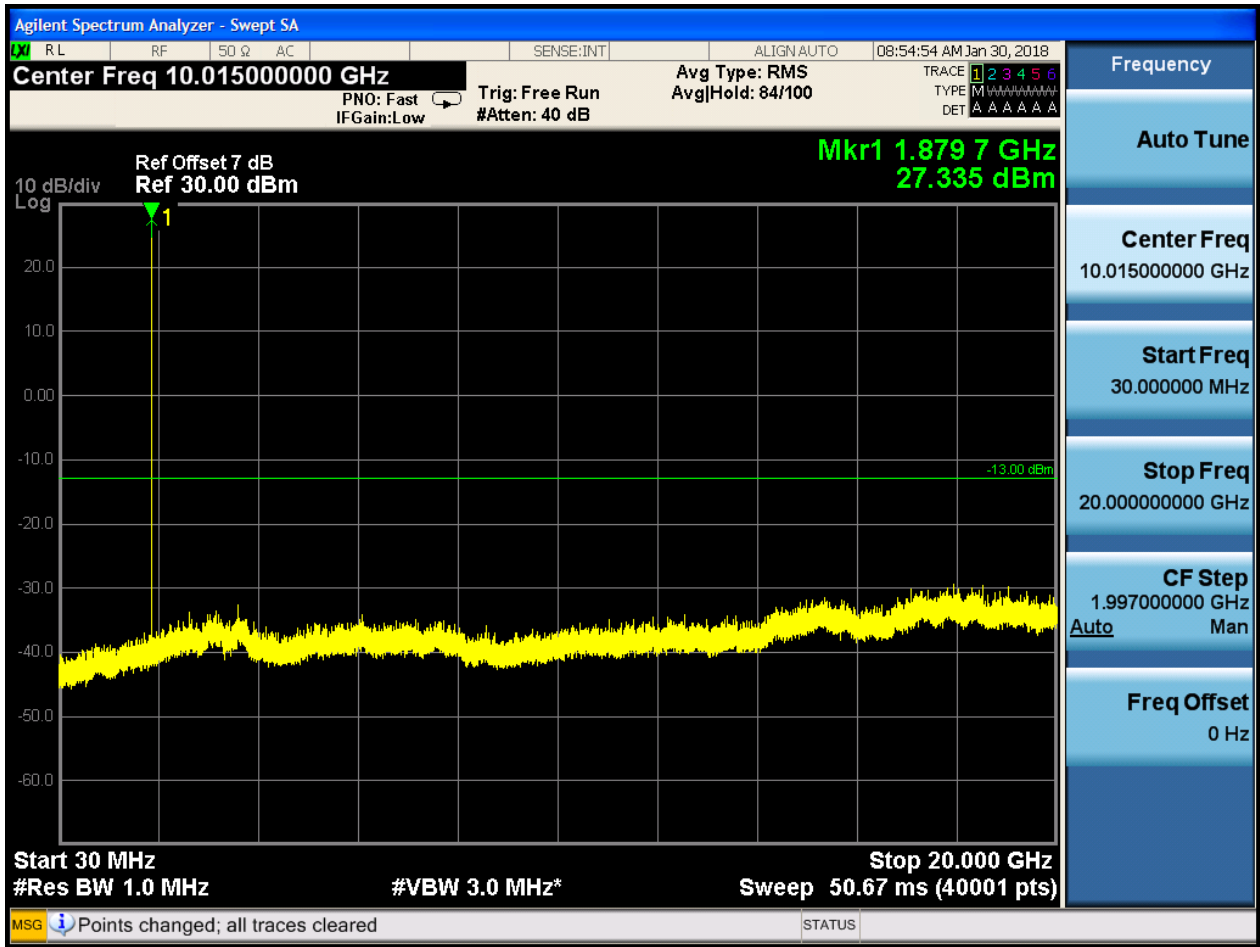


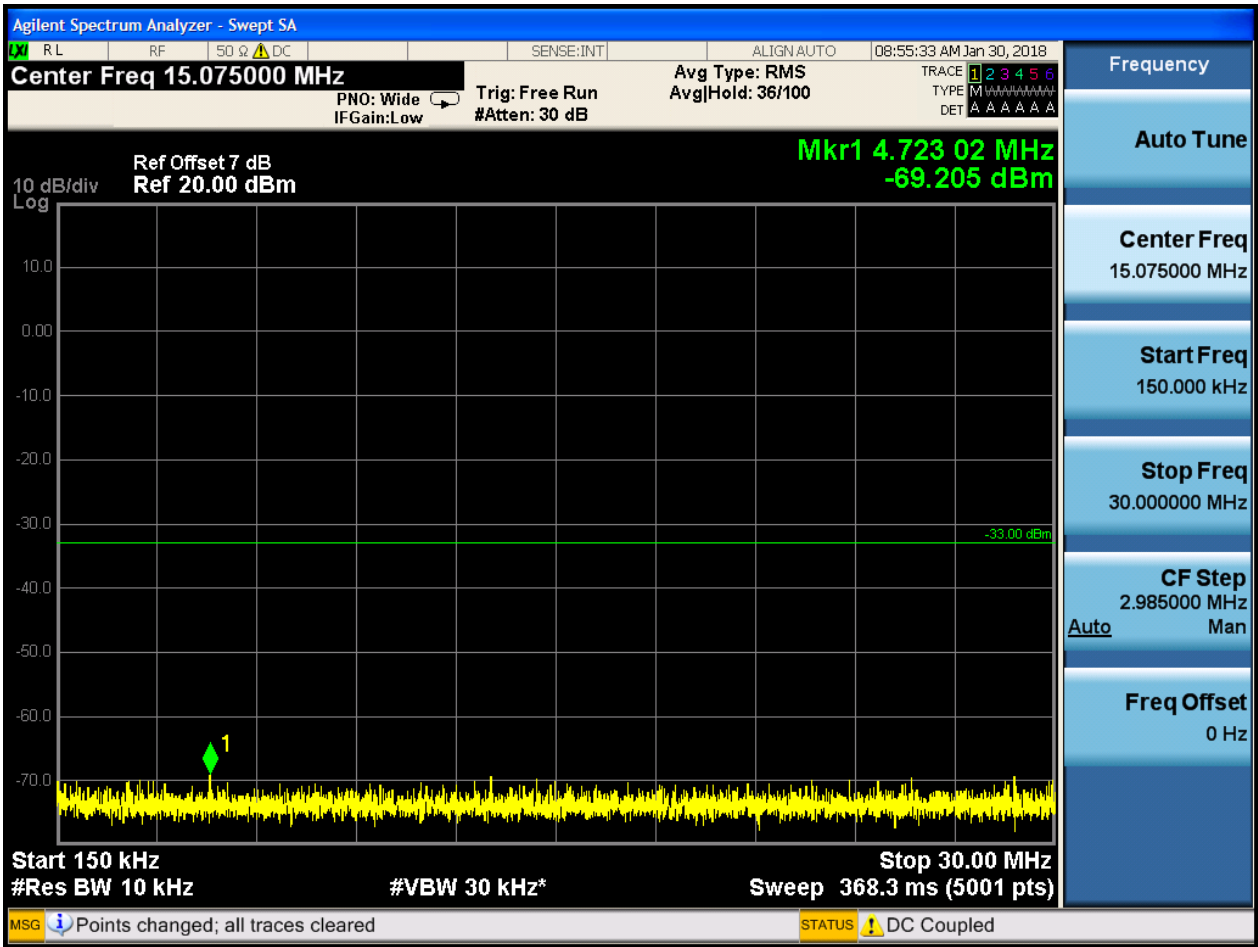


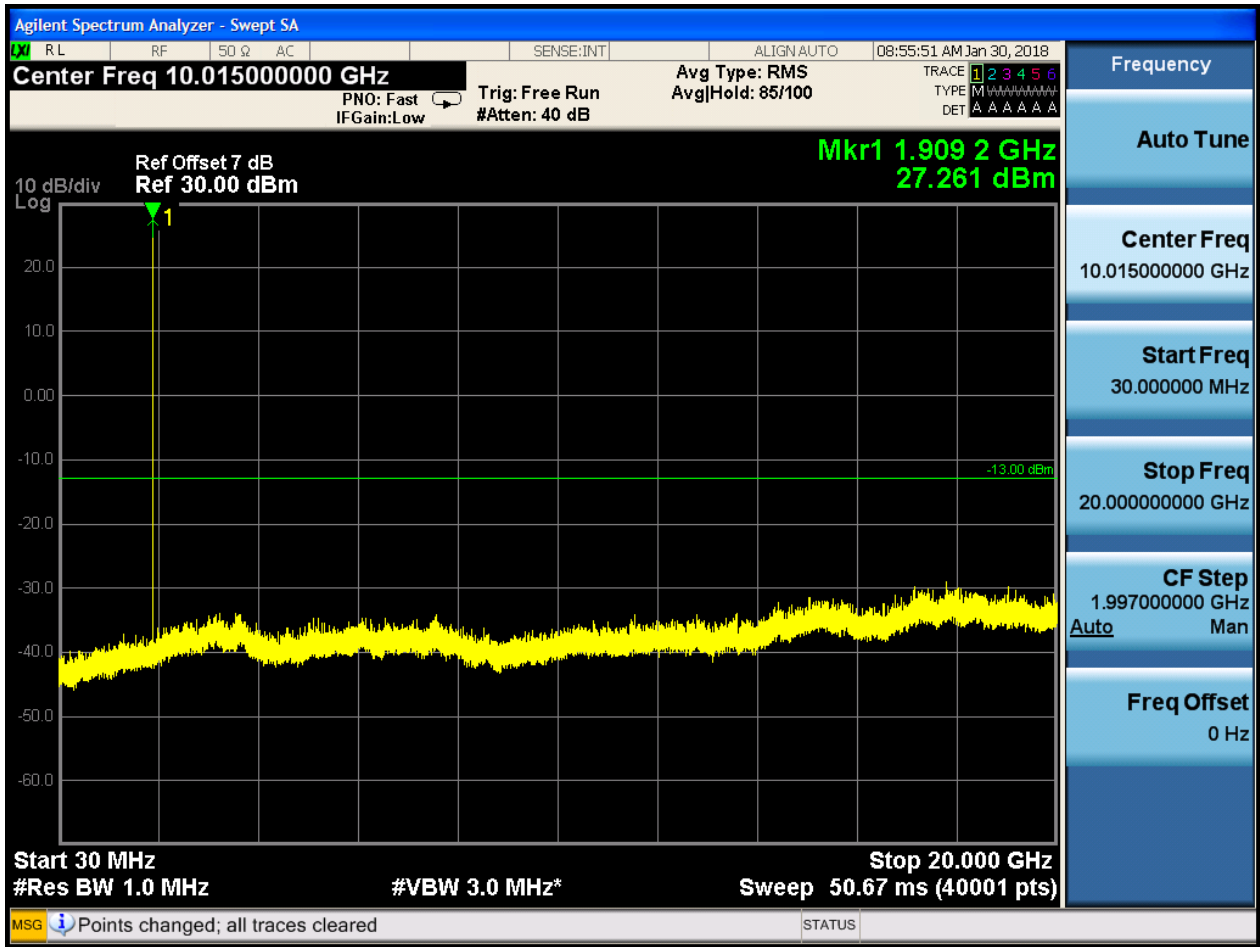
6.1.2.2.2 Test Channel = MCH













7Appendix_G: Field Strength of Spurious Radiation

Note: We tested all modes, but the data presented below is the worst case.

9kHz~150kHz, RBW = 200Hz, VBW = 600 Hz, Detector: PK

150kHz~30MHz, RBW = 9kHz, VBW = 30k Hz, Detector: PK

30MHz~1GHz, RBW = 100 kHz, VBW = 300 kHz. Detector: PK

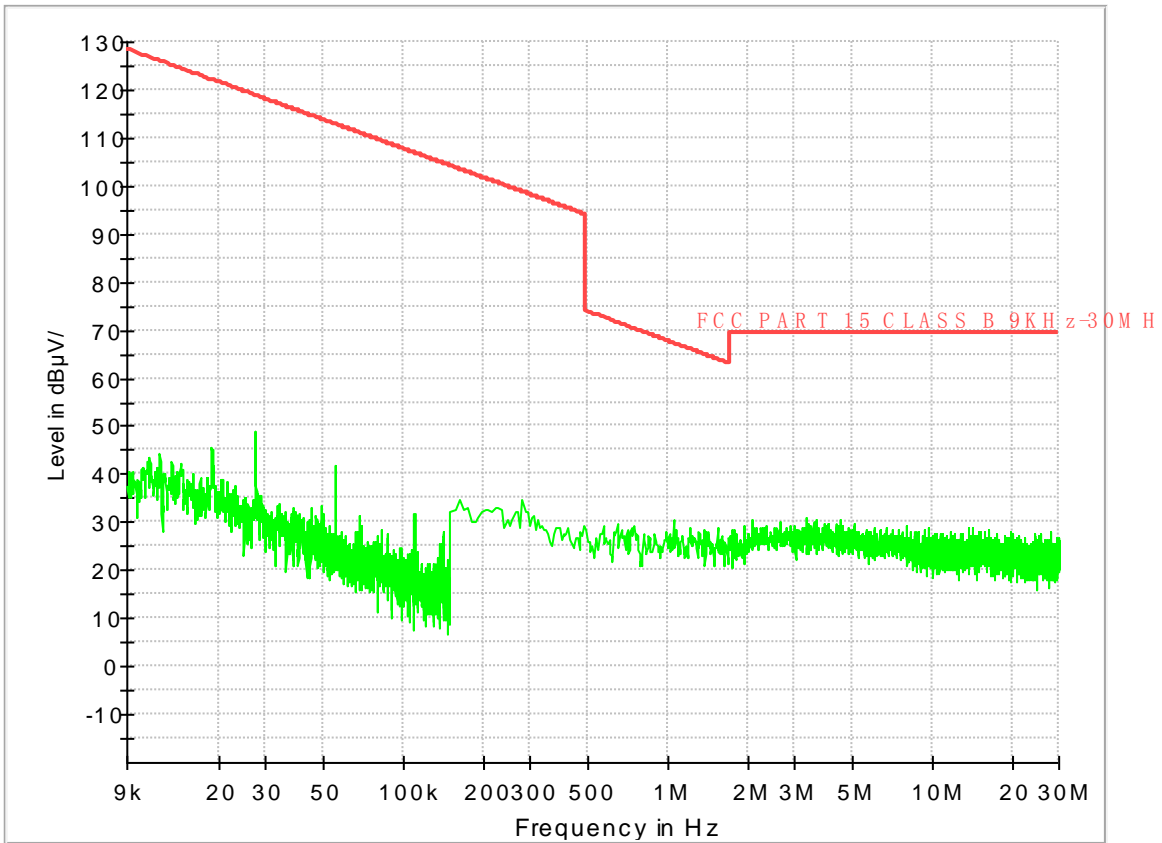
Above 1GHz, RBW = 1 MHz, VBW = 3 MHz. Detector: PK

Part I - Test Plots

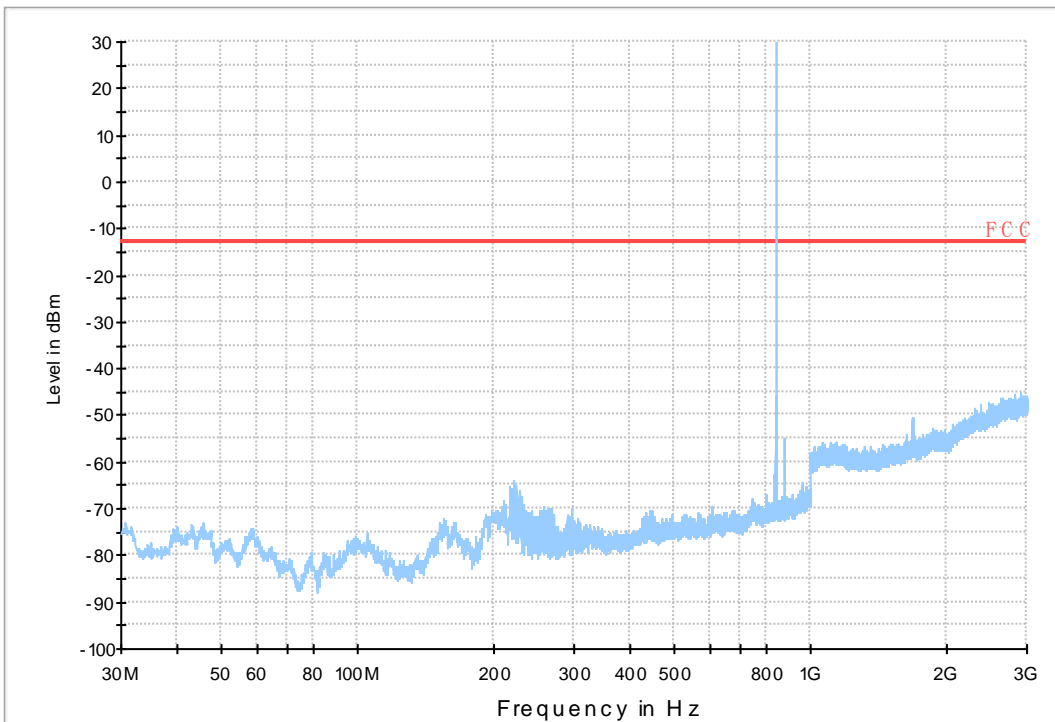
7.1 For GSM

7.1.1 Test Band = GSM850_ANT1

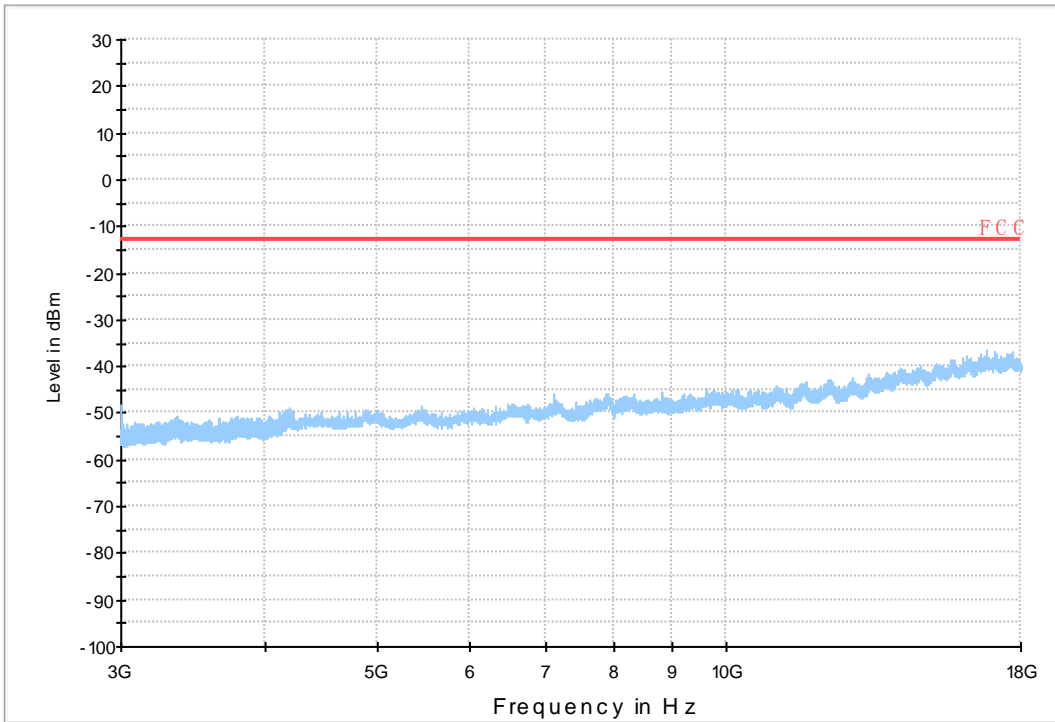
7.1.1.1 Test Mode = GSM/TM1



Copy of FCC PART22 GSM850_L

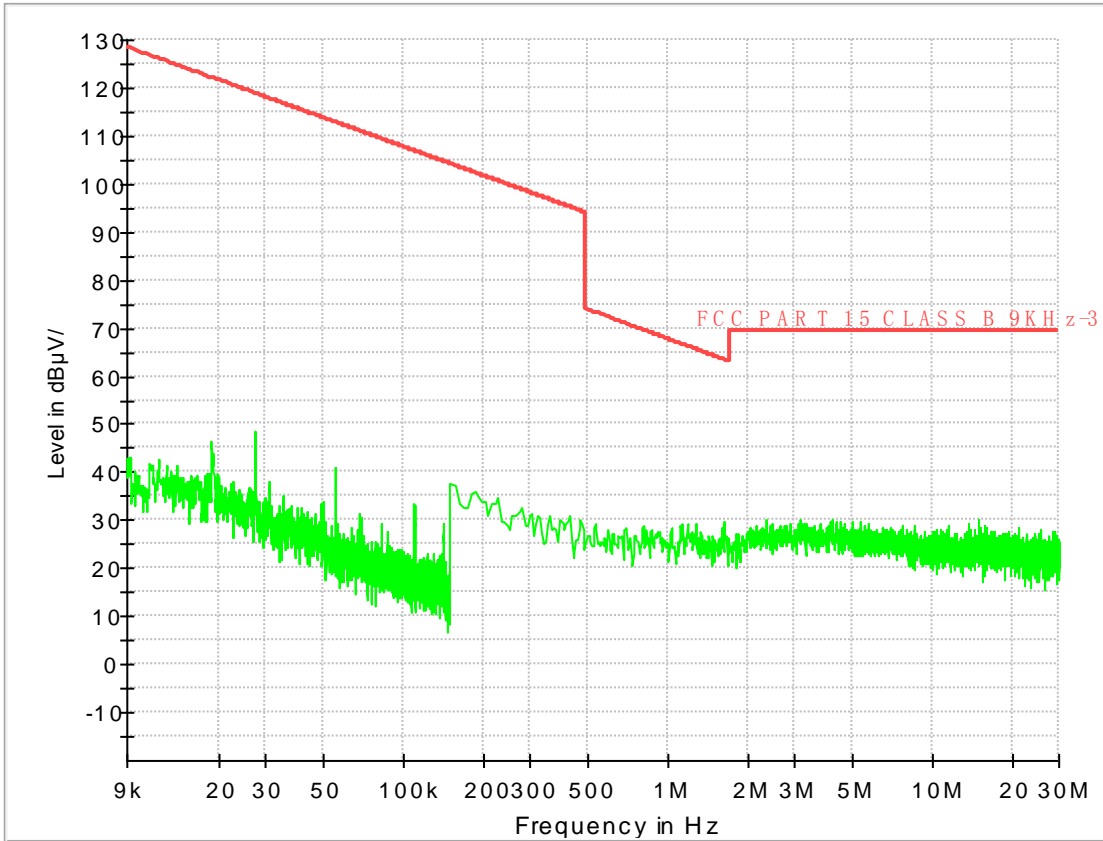


Copy of FCC PART22 GSM850_H

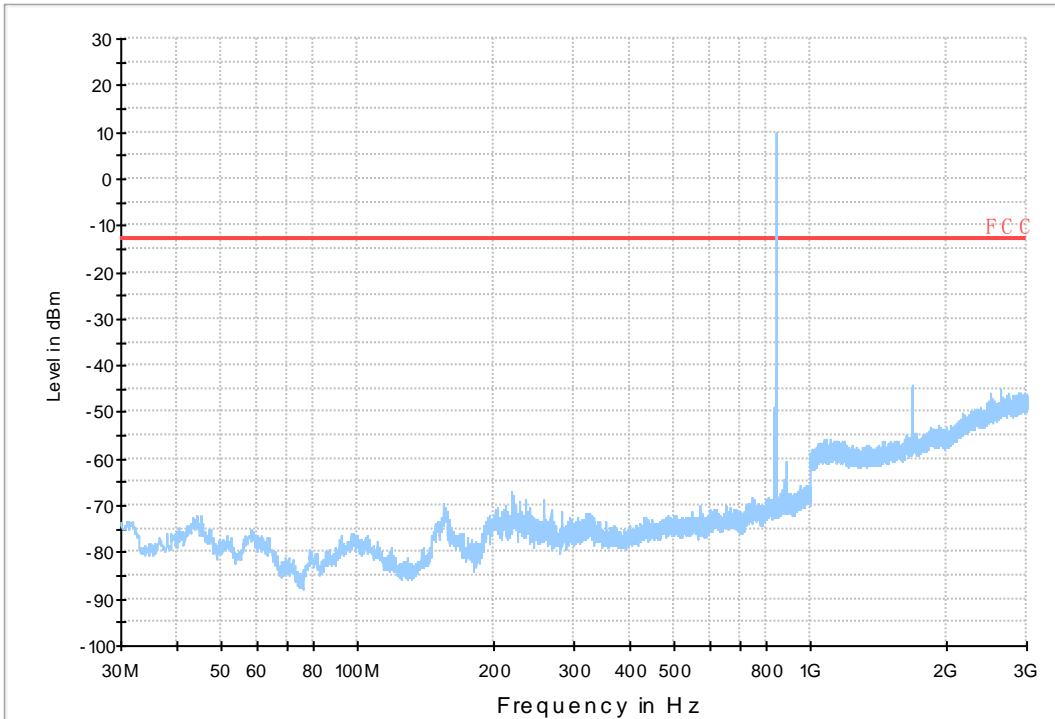


7.1.2 Test Band = GSM850_ANT2

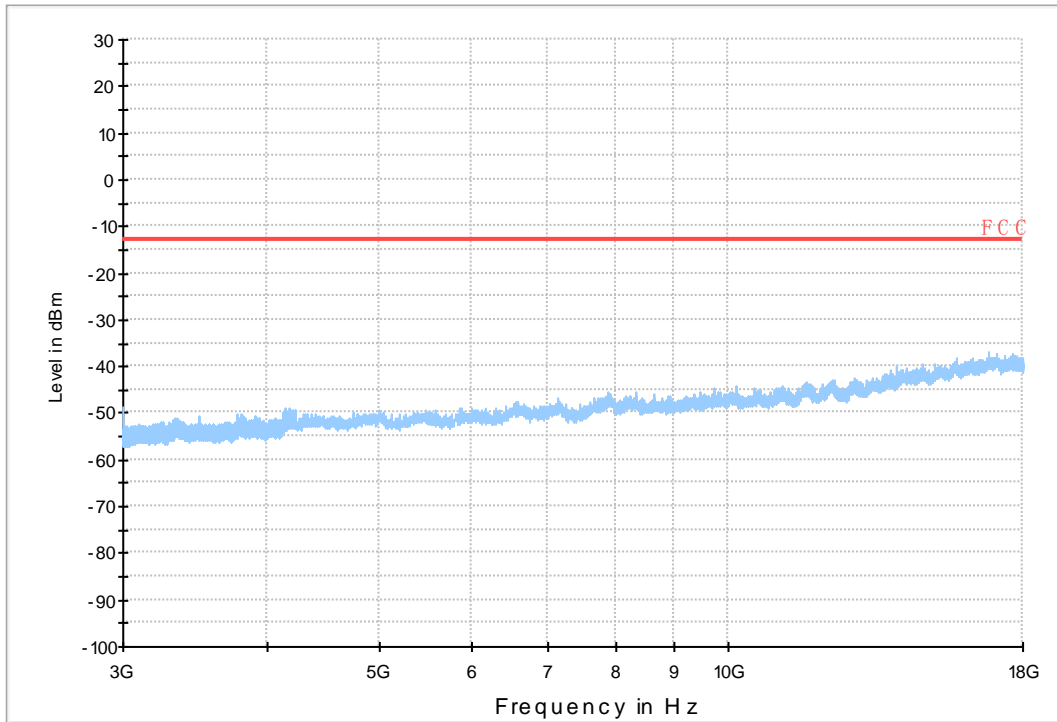
7.1.2.1 Test Mode = GSM/TM1



Copy of FCC PART22 GSM850_L

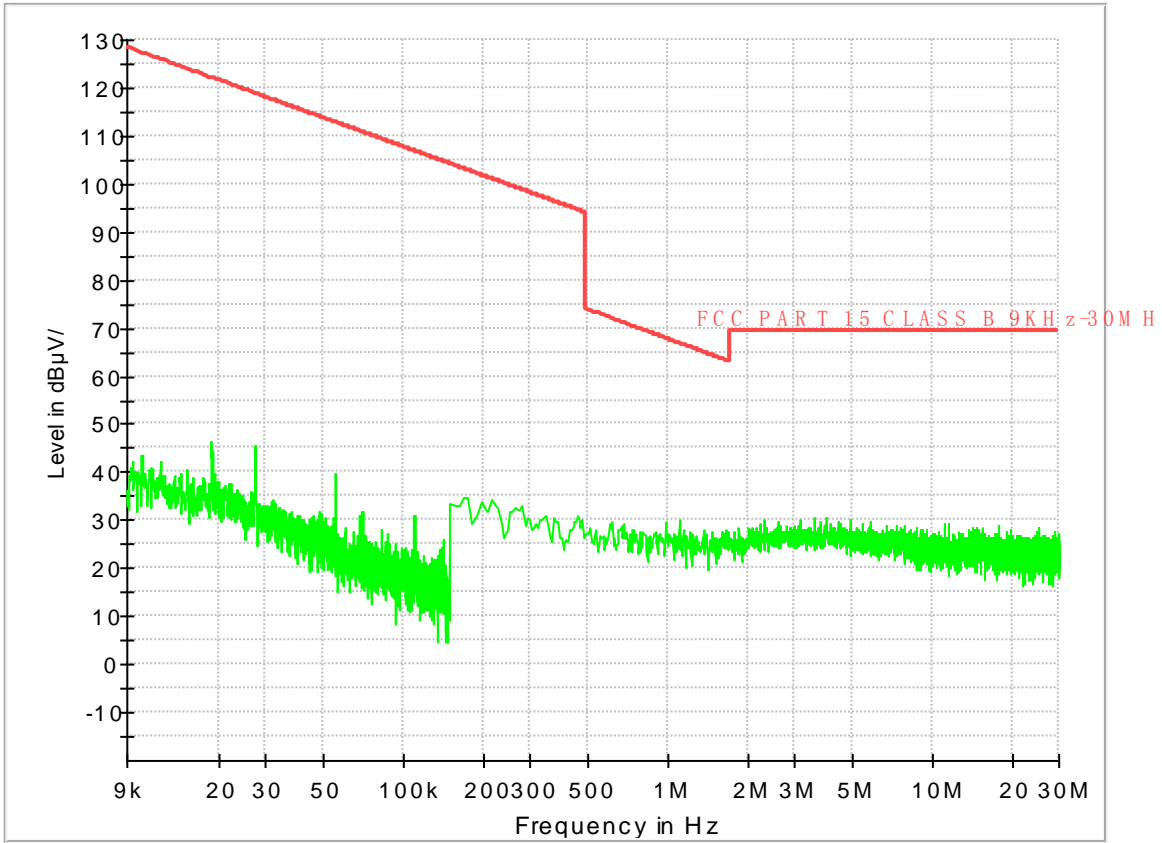


Copy of FCC PART22 GSM850_H

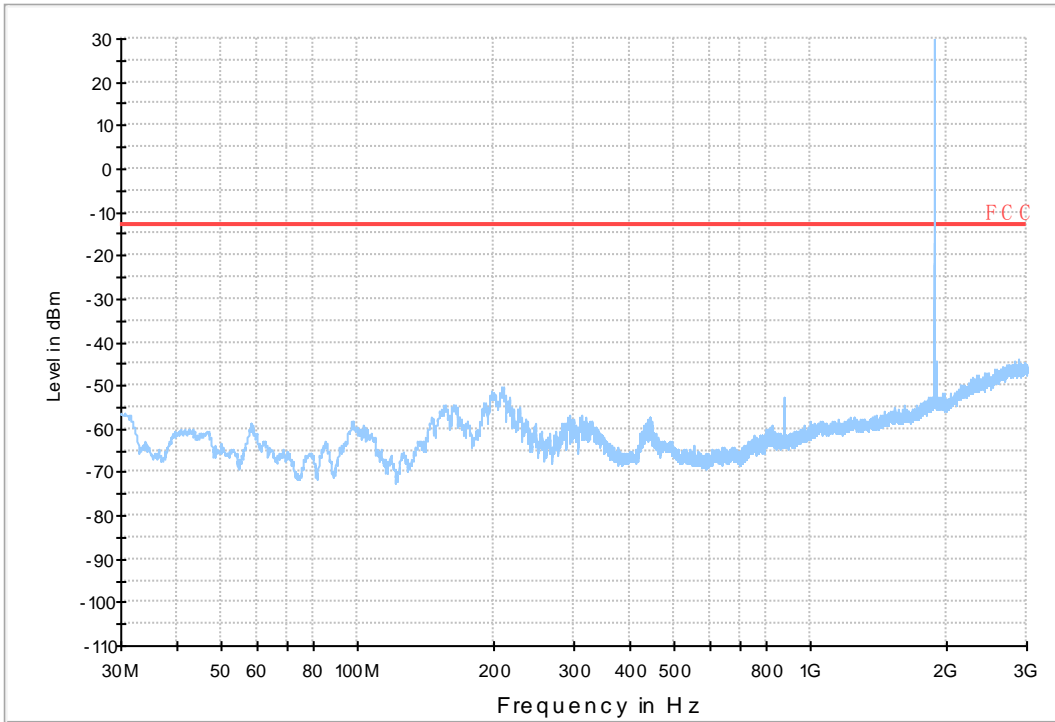


7.1.3 Test Band = GSM1900_ANT1

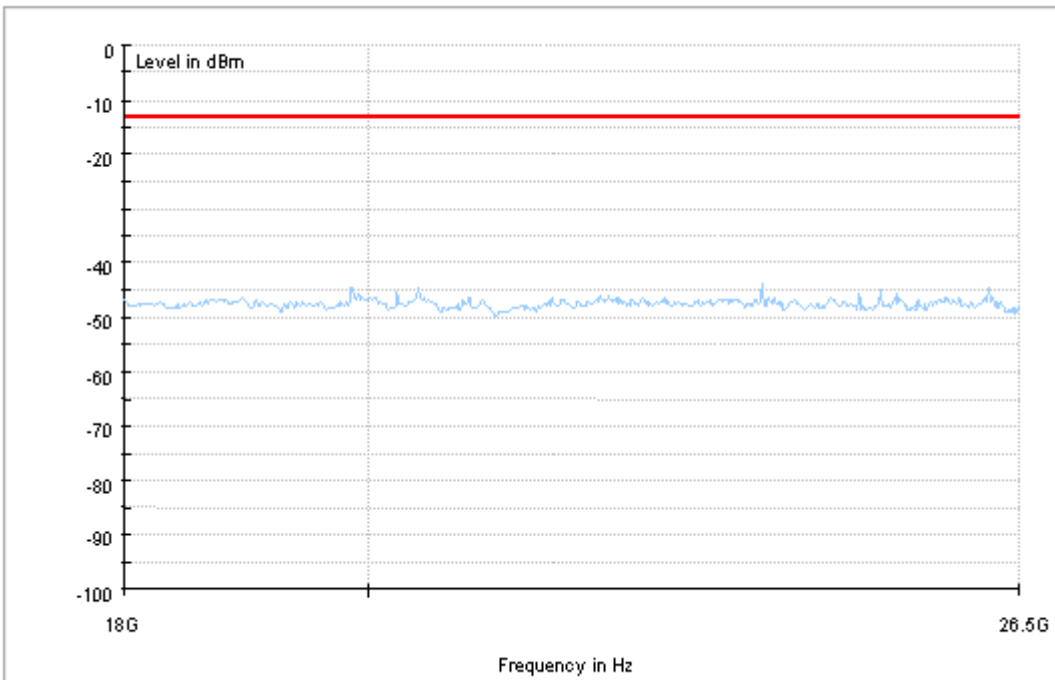
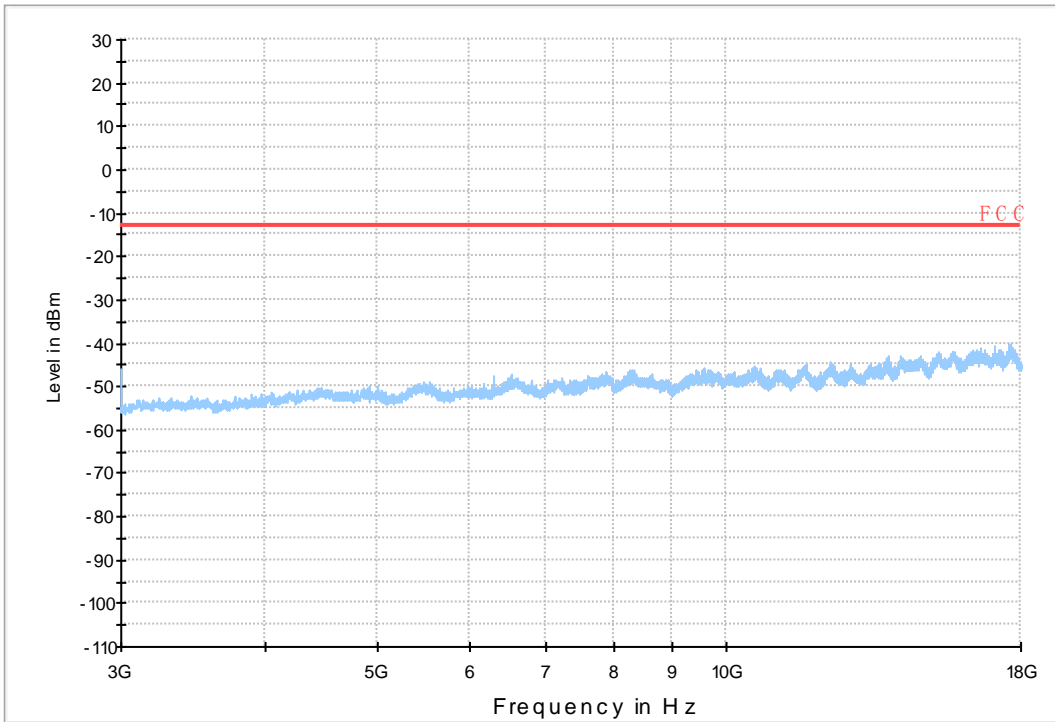
7.1.3.1 Test Mode = GSM/TM1



Copy of FCC PART24 GSM1900_L

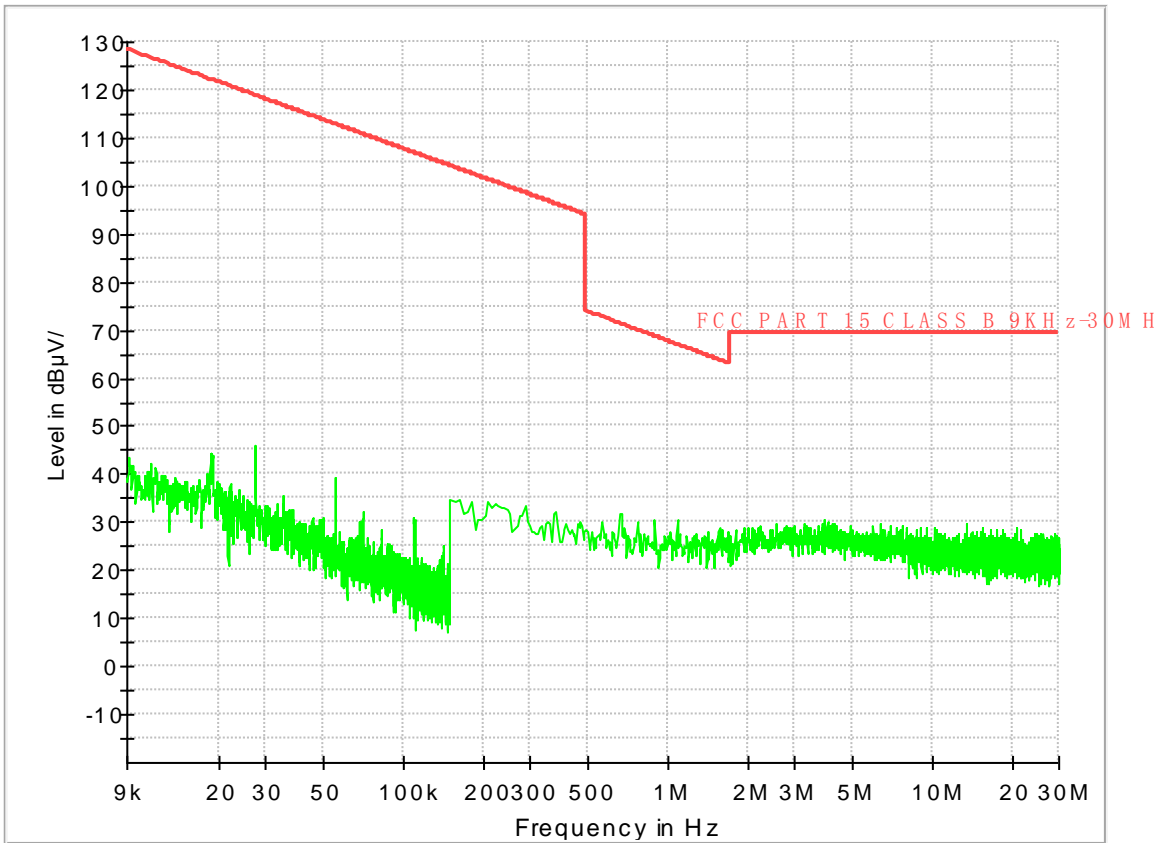


Copy of FCC PART24 GSM1900_H

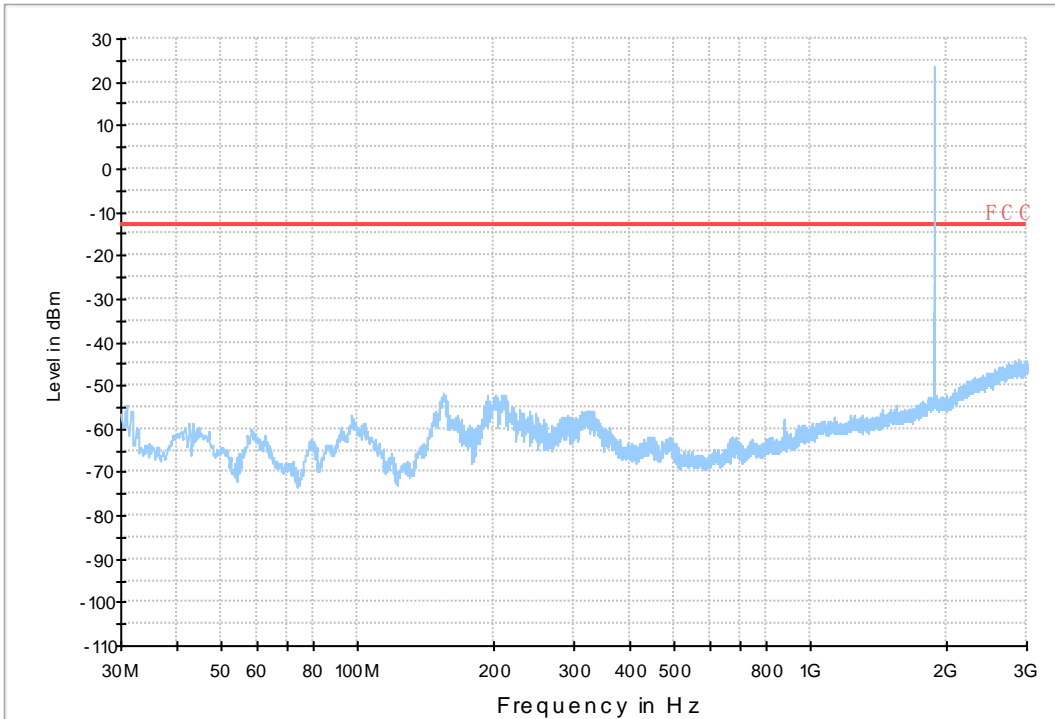


7.1.4 Test Band = GSM1900_ANT2

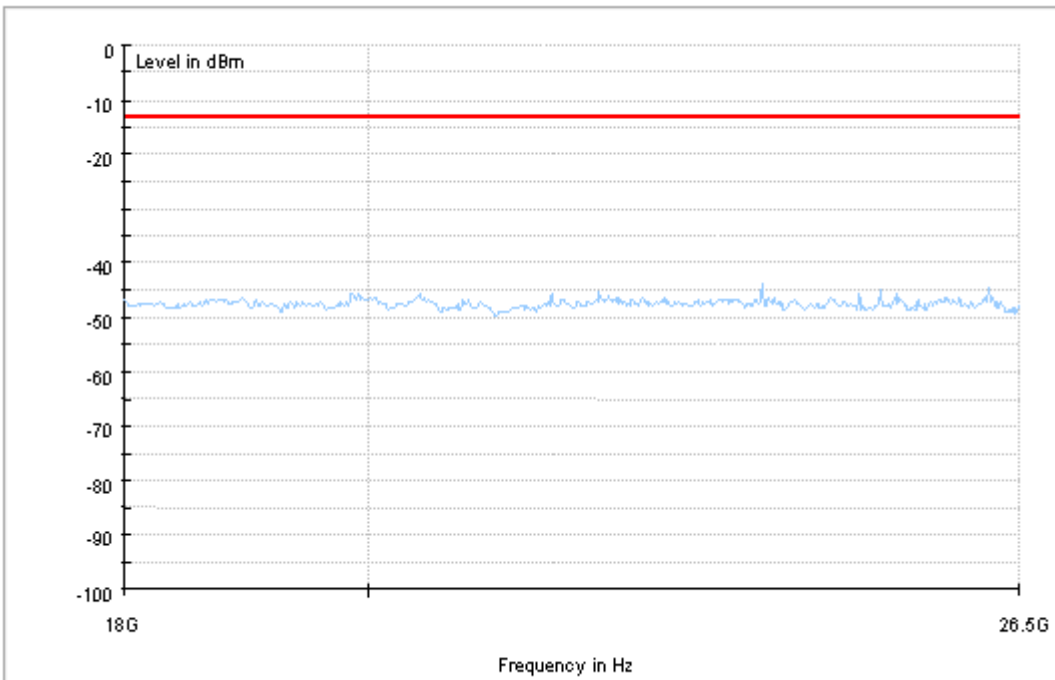
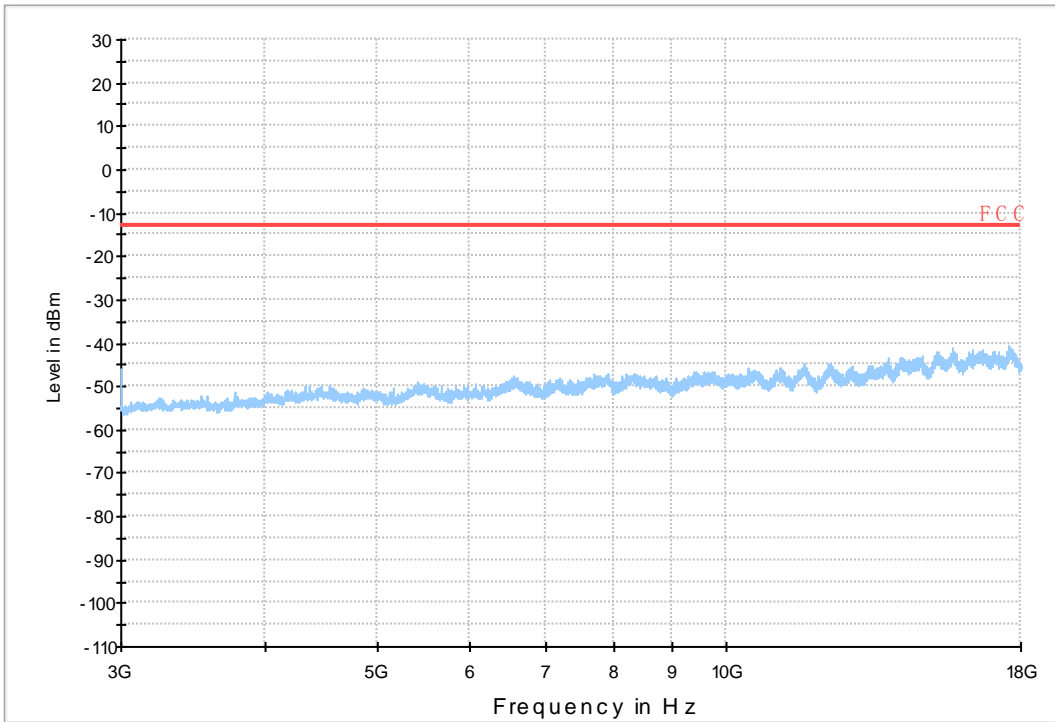
7.1.4.1 Test Mode = GSM/TM1



Copy of FCC PART 24 GSM1900_L



Copy of FCC PART24 GSM1900_H





8Appendix_H: Frequency Stability

8.1 For GSM

8.1.1 Frequency Error vs. Voltage:

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
GSM850	GSM/TM1	LCH	TN	VL	-16.66	-0.02021	PASS
				VN	-14.79	-0.01794	PASS
				VH	-13.69	-0.01661	PASS
		MCH	TN	VL	-13.11	-0.01567	PASS
				VN	-13.82	-0.01652	PASS
				VH	-11.88	-0.0142	PASS
		HCH	TN	VL	-17.11	-0.02016	PASS
				VN	-10.91	-0.01285	PASS
				VH	-6.78	-0.00799	PASS
	GSM/TM2	LCH	TN	VL	5.59	0.00678	PASS
				VN	-15.66	-0.019	PASS
				VH	-7.01	-0.00851	PASS
		MCH	TN	VL	-14.43	-0.01725	PASS
				VN	-7.88	-0.00942	PASS
				VH	-10.85	-0.01297	PASS
		HCH	TN	VL	-21.76	-0.02564	PASS
				VN	-8.91	-0.0105	PASS
				VH	-14.75	-0.01738	PASS
GSM1900	GSM/TM1	LCH	TN	VL	31.45	0.017	PASS
				VN	22.02	0.0119	PASS
				VH	26.41	0.01427	PASS
		MCH	TN	VL	19.05	0.01013	PASS
				VN	21.11	0.01123	PASS
				VH	2.07	0.0011	PASS
		HCH	TN	VL	21.50	0.01126	PASS
				VN	28.35	0.01484	PASS
				VH	21.44	0.01123	PASS
	GSM/TM2	LCH	TN	VL	19.02	0.01028	PASS
				VN	8.56	0.00463	PASS
				VH	17.50	0.00946	PASS
		MCH	TN	VL	9.56	0.00509	PASS
				VN	13.04	0.00694	PASS
				VH			



Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				VH	16.08	0.00855	PASS
		HCH	TN	VL	10.69	0.0056	PASS
				VN	18.98	0.00994	PASS
				VH	21.89	0.01146	PASS

8.1.2 Frequency Error vs. Temperature:

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
GSM850	GSM/TM1	LCH	VN	-30	-14.14	-0.01716	PASS
				-20	-16.53	-0.02006	PASS
				-10	-15.56	-0.01888	PASS
				0	-11.43	-0.01387	PASS
				10	-9.81	-0.0119	PASS
				20	-14.66	-0.01779	PASS
				30	-17.05	-0.02069	PASS
				40	-10.46	-0.01269	PASS
		50	-17.18	-0.02084	PASS		
		MCH	VN	-30	-16.47	-0.01969	PASS
				-20	-15.50	-0.01853	PASS
				-10	-8.46	-0.01011	PASS
				0	-16.08	-0.01922	PASS
				10	-11.43	-0.01366	PASS
				20	-20.21	-0.02416	PASS
				30	-14.59	-0.01744	PASS
				40	-16.92	-0.02022	PASS
		50	-12.46	-0.01489	PASS		
		HCH	VN	-30	-12.53	-0.01476	PASS
				-20	-13.30	-0.01567	PASS
				-10	-15.63	-0.01841	PASS
				0	-15.95	-0.01879	PASS
				10	-10.07	-0.01186	PASS
				20	-14.72	-0.01734	PASS
	30			-10.65	-0.01255	PASS	
	40			-16.85	-0.01985	PASS	
	50	-10.78	-0.0127	PASS			
	GSM/TM2	LCH	VN	-30	-18.08	-0.02194	PASS
				-20	-19.69	-0.02389	PASS
				-10	-20.40	-0.02475	PASS
				0	-13.33	-0.01617	PASS



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict						
				10	-18.73	-0.02273	PASS						
				20	-19.89	-0.02413	PASS						
				30	-12.17	-0.01477	PASS						
				40	-17.27	-0.02095	PASS						
				50	-16.53	-0.02006	PASS						
		MCH	VN			-30	-15.21	-0.01818	PASS				
						-20	-16.24	-0.01941	PASS				
						-10	-10.98	-0.01312	PASS				
						0	-6.33	-0.00757	PASS				
						10	-11.36	-0.01358	PASS				
						20	-17.89	-0.02138	PASS				
						30	-15.27	-0.01825	PASS				
						40	-15.24	-0.01822	PASS				
						50	-18.05	-0.02158	PASS				
						HCH	VN			-30	-13.40	-0.01579	PASS
		-20	-16.27	-0.01917	PASS								
		-10	-18.82	-0.02217	PASS								
		0	-14.27	-0.01681	PASS								
		10	-15.72	-0.01852	PASS								
		20	-5.97	-0.00703	PASS								
		30	-11.40	-0.01343	PASS								
		40	-2.45	-0.00289	PASS								
		50	-12.95	-0.01526	PASS								
		GSM1900	GSM/TM1	LCH	VN					-30	32.16	0.01738	PASS
-20	18.27									0.00987	PASS		
-10	24.09									0.01302	PASS		
0	17.18									0.00929	PASS		
10	20.60									0.01113	PASS		
20	18.92									0.01023	PASS		
30	29.90									0.01616	PASS		
40	25.96									0.01403	PASS		
50	16.98									0.00918	PASS		
MCH	VN									-30	21.31	0.01134	PASS
										-20	24.54	0.01305	PASS
										-10	28.93	0.01539	PASS
										0	24.73	0.01315	PASS
										10	24.02	0.01278	PASS
										20	16.47	0.00876	PASS
										30	19.63	0.01044	PASS
										40	25.18	0.01339	PASS



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
		HCH	VN	50	20.28	0.01079	PASS
				-30	14.40	0.00754	PASS
				-20	17.89	0.00937	PASS
				-10	7.23	0.00379	PASS
				0	18.08	0.00947	PASS
				10	16.92	0.00886	PASS
				20	30.28	0.01586	PASS
				30	20.73	0.01085	PASS
				40	17.05	0.00893	PASS
				50	17.24	0.00903	PASS
	GSM/TM2	LCH	VN	-30	17.82	0.00963	PASS
				-20	13.72	0.00742	PASS
				-10	28.80	0.01557	PASS
				0	14.08	0.00761	PASS
				10	18.73	0.01012	PASS
				20	20.53	0.0111	PASS
				30	14.21	0.00768	PASS
				40	16.85	0.00911	PASS
				50	10.49	0.00567	PASS
				MCH	VN	-30	26.99
		-20	22.08			0.01174	PASS
		-10	22.89			0.01218	PASS
		0	12.88			0.00685	PASS
		10	16.50			0.00878	PASS
		20	14.50			0.00771	PASS
		30	5.71			0.00304	PASS
		40	10.69			0.00569	PASS
		50	27.06			0.01439	PASS
		HCH	VN			-30	19.47
				-20	14.37	0.00752	PASS
				-10	-1.07	-0.00056	PASS
				0	23.47	0.01229	PASS
				10	9.17	0.0048	PASS
				20	9.04	0.00473	PASS
				30	18.44	0.00966	PASS
				40	11.78	0.00617	PASS
50	2.62	0.00137	PASS				

END